

Scanning - Shortwave - Ham Radio - Equipment
Internet Streaming - Computers - Antique Radio

Monitoring Times

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Bletchley Park

Signals

Subterfuge

& Deception

Radio Hobby Mourns Two Icons:

- Gene Hughes, 1927-2008
- Tom Kneitel, 1933-2008

- BBC: More Than a World Service
- The X-Files Radio Net



AR-ALPHA

Communications Receiver



- Multi-mode unit capable of receiving AM (synchronous), ISB, RZ-SSB, USB, LSB, CW, WFM including FM stereo, NFM, APCO-25 digital, and TV in both NTSC and PAL formats
- 6-inch TFT color panel can display received video signals or depict spectrum activity over a wide choice of bandwidths including a "waterfall" function to show signal activity over a specified time period

Welcome to the Future!

AOR proudly introduces the AR-ALPHA, the first in a new class of professional monitoring receivers! Designed to cover 10KHz to 3.3GHz, with no interruptions, this receiver features a 6-inch color TFT display, five VFOs, 2000 alphanumeric memories that can be computer programmed as 40 banks of 50 channels, 40 search banks, a "select memory" bank of 100 frequencies, and a user designated priority channel. It includes APCO-25 digital and a DVR with six channels that can record up to a total of 52 minutes audio. Monitoring professionals will appreciate the world class engineering and attention to detail that makes the AR-ALPHA such an amazing instrument.*

- Composite video output on the rear panel of the unit
- Selectable IF bandwidths: 200 Hz, 500 Hz, 1 KHz, 3 KHz, 6 KHz, 15 KHz, 30 KHz, 100 KHz, 200 KHz and 300 KHz along with the ability to shift the IF.
- CTCSS and DCS selectable squelch functions
- DTMF tone decode
- Built-in voice-inversion descrambling
- CW pitch control, AGC, AFC
- Auto-notch feature
- User selectable spectrum display function from 250 KHz through 10 MHz in 1 KHz increments. Above 10 MHz bandwidth, it can display 20 MHz, 50 MHz, 100 MHz or 1 GHz, but above 20 MHz bandwidth, no audio will be available
- Resolution bandwidth is also user-selectable in increments of 1 KHz, 4 KHz, 32 KHz, 64 KHz, and 128 KHz.
- Fast Fourier Transform (FFT)
- Rear panel connections include 12 VDC power, RS-232C, USB 2.0, I/Q output with 1 MHz bandwidth, two antenna ports (one SO-239 and one Type N) and up to four antennas may be selected through the receiver's controls with the optional AS5000 antenna relay selector.
- Use desktop or with 19" rack mount

The AR-ALPHA redefines excellence in professional monitoring receivers. No wonder so many monitoring professionals including government, newsrooms, laboratories, military users and more, rely on AOR.



AOR U.S.A., Inc.
20655 S. Western Ave., Suite 112, Torrance, CA 90501, USA
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*Specifications subject to change without notice or obligation.
Documentation required for qualified purchasers in the USA.

WiNRADiO® Antenna Accessories

WiNRADiO is not "just" high-performance radios - we also make numerous antennas and antenna accessories for all kinds of applications, as well as complete radio monitoring systems. Browse our web site www.winradio.com and you might find exactly what you need to complete or improve your radio monitoring installation.



WiNRADiO WR-ACD-1800 HF-VHF/UHF Dual Antenna Combiner

The WR-ACD-1800 Dual Antenna Combiner is designed to provide a quick and easy solution to a common problem, connecting separate HF and VHF/UHF antennas to a single-input scanning receiver. It also contains Bias 'T' circuitry to provide DC power injection for active antennas.

WiNRADiO WR-DASP-2500 Dual-Action Surge Protector

The WR-DASP-2500 coaxial surge protector is designed to protect the receiver antenna input against damage caused by electrostatic discharge. This is achieved by a combination of two protective elements: a fast-acting semiconductor device and a gas-discharge tube.

WiNRADiO WR-UBF-1800 Universal Broadcast Filter

The WR-UBF-1800 Universal Broadcast Filter is a user-definable bandstop AM or FM broadcast filter or attenuator making it possible to filter out strong local broadcast stations interfering with reception or overloading a receiver.

WiNRADiO WR-BT-650 HF/VHF Power Injector (Bias 'T')

The WR-BT-650 Power Injector (Bias 'T') provides a means of injecting DC power in a coaxial cable, to power remotely-located devices. It features a very flat frequency response, and a wide frequency range, from 20 kHz to 650 MHz.

WiNRADiO WR-BT-3500 VHF/UHF Power Injector (Bias 'T')

The WR-BT-3500 Power Injector (Bias 'T') provides a means of injecting DC power in a coaxial cable, to power remotely-located devices such as active antennas, low-noise amplifiers and downconverters. This device can be used in a wide frequency range, from 50 to 3500 MHz.

WiNRADiO WR-LNA-3500 Low Noise Amplifier

The WR-LNA-3500 Low Noise Amplifier is an ultra-low noise figure preamplifier designed to operate in the range of 30-3500 MHz. It employs the latest Silicon Germanium Heterostructure Bipolar Transistor technology (SiGe HBT) to achieve excellent performance.

WiNRADiO WR-DNC-3500 Frequency Downconverter

The WR-DNC-3500 Downconverter contains a high-stability local oscillator, mixer and filters to convert an incoming frequency range of 1700-3500 MHz down to 0-1800 MHz which can extend the frequency range of VHF/UHF receivers.

WiNRADiO WR-LWA-0130 Long Wire Adaptor

The WR-LWA-0130 Long Wire Antenna Adapter is designed to work on medium and short wave bands, covering a frequency range from 0.1 to 30 MHz. It is especially suitable for use with WiNRADiO shortwave receivers, such as the WR-G303 or WR-G313 series of receivers.

WiNRADiO WR-CMC-30 Common-Mode Choke

The WR-CMC-30 provides a means of reducing or eliminating common-mode noise from an antenna feedline (generated by computers, lamp dimmers and other electric or electronic appliances), resulting in a considerable increase of the received signal quality.

Monitoring Times

Vol. 27 No. 10

October 2008



Signals, Subterfuge and Deception

By Roy Stevenson

One of the factors credited with shortening the Second World War was the hard-won ability to decode German and Japanese coded messages. The Allied forces sank a staggering amount of resources into the effort, and the museum at Bletchley Park, England, brings it home to the visitor in a very graphic and compelling way.

Our “spooky” tale for October is a tour of this facility, whose full importance to the European war effort was not revealed to the world until the mid 1970s. For the full story, turn to page 9.

On Our Cover:

The Bletchley Park manor became headquarters for the Code and Decipher school due to its proximity to Oxford and Cambridge Universities. Photo by the author.

C O N T E N T S

BBC: More Than a World Service 12

By Loyd Van Horn

Throughout its 80-year history, the BBC has been on the cutting edge of broadcast technology. Even though we may bewail the reduction of its renowned World Service via shortwave, the full range of BBC programs and stations have never been so accessible as they are today. Here’s a look at the full range of radio and television which can be tuned in over the internet.

Tuning in to Transmission Art 16

By Christopher Friesen

Creativity in art often involves finding beauty and new meaning in odd juxtapositions. Be prepared to find radio used in ways you never imagined! Maybe you’ll even discover the artist in yourself in a new application for that old CW key! Music to my ears ...



Reviews

When is a power supply not just a power supply? Answer: when it can eliminate its own generated noise! And that’s just what the new Alinco DM-330MV switching power supply does. Check it out on page 68.

We’ve often wondered what the point was of those little wide-spectrum-coverage scanners, especially the handheld ones with the rubber duck antenna. You’re not going to receive HF on that stubby antenna! But

check out the signals when you attach the Performance HF antenna – It’s a world of difference. (See page 71)

Think your hard drive is bigger than you’ll ever use? That’s what John Catalano thought, too. But when he had to upgrade to a bigger drive, he credits Acronis True Image Home with making the switch safely without losing files, programs, or settings. (Page 72)



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Address: 7540 Highway 64 West,
Brasstown, NC 28902-0098
Telephone: (828) 837-9200
Fax: (828) 837-2216 (24 hours)
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Subscription Questions?
belinda@grove-ent.com

Owners
Bob and Judy Grove
judy@grove-ent.com

Publisher
Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Managing Editor
Rachel Baughn, KE4OPD
editor@monitoringtimes.com

Assistant Editor
Larry Van Horn, N5FPW
larryvanhorn@monitoringtimes.com

Art Director
Bill Grove

Advertising Svcs.
Beth Leinbach
(828) 389-4007
bethleinbach@monitoringtimes.com

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EDITORIAL STAFF Email firstlast@monitoringtimes.com

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Mike Chace..... Digital Digest
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Bob Grove..... Ask Bob
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Chris Parris..... Fed Files
Ken Reitz..... Beginners Corner
..... Communications
Iden Rogers..... Planes
Clem Small..... Antenna Topics
Doug Smith..... American Bandscan

Hugh Stegman..... Utility World
Ernest Robl..... Trains
Gayle Van Horn..... Frequency Manager
..... Broadcast Logs
..... QSL Corner
Larry Van Horn..... Milcom
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..... Reviews Editor
..... What's New?
Dan Veeneman..... Scanning Report
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GRUNDIG

TIMELESS PERFORMANCE

60th
Anniversary

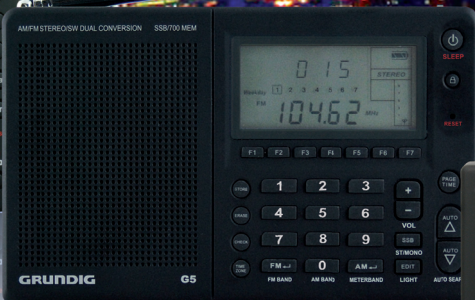
LISTEN TO THE WORLD



G4 WORLD RECORDER

AM/FM/Shortwave Portable
Radio with MP3 And SD player | \$200.00

- AM/FM-stereo and Shortwave (3000-29999KHz)
- Digital Display world-band radio
- Digital tuning methods including Auto-scan, Manual-San, Direct Key-in and Manual Tuning
- FM Station Tuning Storage (ATS) provides automatic acquisition of the strongest stations in your area
- Built-in 1GB/2GB flash, USB 2.0 high speed transmission



CONSUMER DIGEST BEST BUY AWARD 2007

G5 GLOBAL TRAVELER

AM/FM/Shortwave with SSB | \$150.00

- AM/FM-stereo and Shortwave (1711-29999 KHz)
- Single Side Band (SSB)
- Digital Phase Lock Loop (PLL) dual conversion
- Digital Display world-band radio
- Station name input features allow a 4-character input of the stations call letters



G6 AVIATOR

AM/FM/Shortwave with SSB | \$100.00

- AM, FM, Aircraft Band (117-137 MHz) and Shortwave (1711-30000 KHz)
- Dual conversion
- Three types of automatic scan tuning
- 700 memories with 4 character page naming
- 3 programmable alarm timers (volume and frequency can be preset)



Receives
AM Band



Receives
FM Band



Receives
Shortwave Band



Alarm
Clock



Headphone
Jack



Satellit 750

AM/FM/Shortwave Radio with SSB | \$300.00

- AM, FM, Aircraft Band (118-137 MHz) and Shortwave (1711-30000 KHz)
- Set 9/10 KHz AM tuning; set FM tuning range
- Single Side Band (SSB)
- Auto/Manual/Direct frequency key-in and station memory tuning
- 1000 station memories (each band 100 memories, 500 customizable)



GS350DL FIELD RADIO

AM/FM/Shortwave Radio | \$100.00

- AM (530-1710 KHz), FM (88-108 MHz) and Shortwave – continuous coverage
- Highly sensitive and selective analog tuner circuitry with AM/SW frequency lock
- Rotary volume control
- Main tuning knob and independent fine-tuning control knob
- Variable RF gain control

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COMMUNICATIONS

by Ken Reitz

SHORTWAVE/AMATEUR RADIO

RNW Wants its History Back

According to its on-line blog, Radio Netherlands Worldwide is seeking old copies of its original programming disks made in the 1940s and 1950s. "We have discovered that some programmes, especially in English, that were produced for the Programme Export department, or Transcription Service as it was then called, are no longer in the archive. With the arrival of stereo production, the old mono recordings were discarded and, unfortunately, destroyed," said Martien Sleutjes of RNW.

The original 16" disks were produced in the U.S. and Canada, but copies seldom made it back to RNW headquarters in Hilversum. If you can help or just want to know more go to: <http://blogs.rnw.nl/medianetwork/a-plea-for-help-with-our-historical-audio-archive>.

ARRL's Big Project: Big Success

The American Radio Relay League reported in August that their "Education & Technology Program," known as the "Big Project," (see *MT* September, 2007) has "expanded to six four-day sessions that now include ATV and radio astronomy, more hands-on instruction of project kits – such as a seismometer, a 24-hour clock and a BOT instructor's board – to enhance the teachers' ability to instruct basic robotics, a fox-hunt activity and satellite contacts."

The report quotes Mary Hobart K1MMH, ARRL chief development officer as saying, "[The Big Project] is truly one of the ARRL's most significant projects. The contributions of ARRL members make a direct connection to teachers and their students, opening the door to amateur radio and other exciting areas of science."

Individuals wanting to know more about the project, how to donate specifically to the project or how to start Big Project programs at your local school can contact Hobart at ARRL headquarters k1mmh@arrl.org.

The Price of Vanity

The FCC has announced that the fee charged for amateur radio vanity call signs will increase from \$11.70 to \$12.30. But, since the license is good for 10 years, that works out to just \$1.23/year to keep your vanity. Now, if it was just that cheap to shed those 10 or 20 vanity pounds!

BROADCASTING

Flashback to the Cold War

Leslie Stimson, in the Leslie Report on *Radio World On-line*, reported in August that

an unidentified Cuban AMer was transmitting American music and using a Spanish language DJ on 710 kHz. The report said that the signal blasted up the east coast and was interfering with WOR. The station was monitored by the FCC at numerous locations throughout the U.S. and it was determined that the source of the programming originated in Cuba. Speculation in the report was that this action may have been a reaction to the fact that the US State Department bought time on WQAM, Miami, also on 710 kHz, which beamed the programming to Cuba.

SATELLITE RADIO

Commission Finally OKs Merger

In a five page press release dated July 25, 2008, the Federal Communications Commission (FCC) approved the merger of the only two licensees of the Satellite Digital Audio Radio Service (SDARS), XM and Sirius. In the release, the Commission acknowledged that the merger was harmful to consumers but believed that harm would be softened by asking the two parties to voluntarily abide by conditions it laid down. Among the main commitments the two have volunteered to agree are:

- A cap on prices for 36 months after the merger is completed. After that the Commission will ask the public if the cap should be "extended, removed or modified."
- Within three months of the transaction to offer consumers, "the ability to receive a number of new programming packages, including the ability to select programming on an a la carte basis."
- Allow four percent of its capacity for use by "certain qualified entities, and an additional four percent of its capacity for the delivery of noncommercial educational or informational (NCE) programming."
- Make interoperable receivers available to the retail after-market within nine months of the completion of the merger.
- Deny exclusive rights to manufacture, market or sell SDARS receivers; allow manufacturers to include in any receiver "non-interfering hybrid digital terrestrial radio functionality, iPod compatibility, or other audio technology."

The agreement reminds the two parties that they aren't allowed to use terrestrial repeaters to distribute local content that is, "distinct from that provided to subscribers nationwide via satellite;" and that they are barred from "entering into agreements that would bar any terrestrial radio station from broadcasting live local sporting events."

The Commission repealed the prohibition of just such a merger in the original 1997 SDARS Report and Order. The commission also terminated their investigation into both parties' "compliance with FCC regulations

governing FM modulators and terrestrial repeaters." The Commission slapped both companies with fines: \$17.4 million to XM and \$2.2 million to Sirius to end that matter.

XM/Sirius Top Brass Bonanza

The *Washington Post's* annual "Executive Compensation Report," released just days after the FCC announced the XM/Sirius merger, sheds some light into why the two satellite radio broadcasters were going broke following years of operating in the red and handing out spectacular celebrity contracts. The report showed that two top XM officials raked in nearly \$10 million last year from the D.C.-based company that lost \$682 million the same year.

According to required SEC filings, Sirius, while also losing more than half a billion dollars in their business last year, handed out more than \$44 million in salaries, bonuses and stock awards and options to its top officers. CEO Mel Karmazin, "...in recognition of his performance and our corporate performance..." scooped up more than \$32 million total compensation for his performance in 2007, up from \$31 million the previous year, another during which the company lost hundreds of millions of dollars.

PUBLIC SERVICE

Tow Truck Heroes

A report in the *Mississauga* (Ontario) *News* details the efforts of two tow truck drivers who captured a driver alleged to have been involved in a hit-and-run accident. One alert tow truck driver heard the report on his police scanner while on the road near the accident. Spotting a vehicle with a crumpled hood that fit the description, he began a pursuit.

After being forced to stop by the tow truck, the alleged perpetrator took off when the tow truck driver went back to his truck to call police. Once again in pursuit, the first tow truck driver enlisted the help of a second and together they boxed in the escapee and, according to the article, took the keys out of the ignition and, this time, physically held the driver until police arrived.

Hacker Scares Clevelanders

A report on WKYC-TV, Cleveland, Ohio, said that false tornado warnings that rattled nerves of citizens near the warning horn sites were apparently the work of a hacker who was able to use tones to trigger the system. It was the second such hack this year and forced authorities to close the system until the hacker was caught or a different trigger system could

be devised. According to the report, police had to put messages on 14,000 homes in the affected area and will have to call individual homes if a real emergency comes up before a solution is found.

FCC ENFORCEMENT

El Paso Station Cited

The FCC cited El Paso station KROD-AM for having a busted signal strength meter that hadn't been calibrated in over 10 years; that the phasing of their towers were outside the FCC limits; but, insult to injury, they were cited for having missing ground radials which were apparently stolen by copper thieves.

Hawaiian Station Skips EAS Test

You might think that a station in Hawaii, where volcanoes are a distinct possibility along with typhoons, might make sure it runs the required monthly EAS test. You might think that would be the case especially if your station was owned by a company called "Blow Up, LLC." Still, KKEA-AM 1420 Honolulu didn't; the FCC noticed, and they were nailed with a Notice of Violation for not doing so.

More EAS Shenanigans

Things didn't go much better for WLAA, Ocoee, Florida when FCC agents arrived to find out why the station hadn't been broadcasting EAS tests when they were supposed to. According to FCC documents, what they found was that the station's EAS equipment was nonfunctional, that the station had no EAS log or any record of ever having performed the required monthly tests. And, the station had virtually nothing in their required file of documents for public viewing.

The Commission noted that the fine for not having operational EAS gear was \$8,000 and the fine for failing to have a complete public documents file was \$10,000. But, because the station had at least something in the file that fine was reduced to \$4,000. But, wait, it turns out that the owner had received two prior Notices of Violation and two previous Notices of Apparent Liability, so that fine was doubled to \$8,000. Their bill comes to \$16,000.

OBITUARY

Radio Hobby Loses Two Heroes

August was a sad month for radio hobbyists, especially those of us who remember the excitement of the early days of scanning. In three weeks' time, we lost two legendary literary figures who made enduring contributions to the evolution of the hobby. Bob Grove, publisher of *Monitoring Times*, speaks for all of us as he remembers them with affection and deep gratitude in the following obituaries.

Gene Hughes (Gene Hugh Costin) 1927-2008

Gene Hughes, the founding publisher of the *Police Call* scanner frequency guides distributed by Radio Shack®, lost his battle with cancer August 1, 2008.

Born Gene Hugh Costin in Louisville, KY, November 25, 1927, he moved with his parents at the age of 12 to Los Angeles. As a young man he developed interests in astronomy and radio, and in 1940 began listening to shortwave signals on an old radio sent to him by his uncle, intercepting police calls in the old 1.7 MHz band.



Photo credit: <http://genecostin.com/>

Jotting down the call signs, frequencies and codes he heard, Gene began a journey that would make him well known and respected in the radio community. In 1964, Gene published the cumulative information in a 16 page manual entitled, "Police Call," which lasted for 41 years as it blossomed into sales of a half million annual copies when distributed by Radio Shack® before he retired it in 2005.

Gene loved his community, and his community loved him; he received the Crime Prevention Volunteer of the Year award in 1998 from the State of California for his services as a Technical Reserve Officer at the Los Angeles Police Department where he provided front-desk duty, as well as developed crime prevention materials and seminars.

That service was preceded in the 1980s by his work with the LAPD "HamWatch" group, amateur radio operators who used their communications to assist uniformed officers.

Gene will also be remembered by the fortunate readers who attended his seminar on scanning at a *Monitoring Times* convention. He will be missed by all of us, and especially by his devoted wife Mitzi, three children, and four grandchildren.

Tom Kneitel 1933 - 2008

It is with great sadness that we report the loss of another of our hobby's greatest supporters, Tom Kneitel. Tommy, as his friends knew him, was a prolific writer, spending as much as 18 hours a day at his typewriter to avoid ever missing a deadline.

He is best remembered to our readers as the editor of *Popular Communications* magazine, and a major contributor to other magazines as well, such as *S9*, *CB Horizons*, *Popular Electronics*, and even *TV Guide*. In addition, Tommy authored the legend *Top Secret Registry of U.S. Government Radio Frequencies* and *How to Tune in on Telephone Calls*.

Judy Kneitel, Tommy's wife of 54 years, remembers with fondness how her husband would sit at the dials of his radios and exclaim, "My goodness, I'm having fun and they're paying me for this!" His multifaceted radio interests shared scanning, shortwave, ham radio (call sign W4XAA, originally K2AES) and CB (handle: "Tomcat").

Tommy's flair for theatrics in his writing was understandable; his grandfather was Max Fleischer, the famed film animator who created

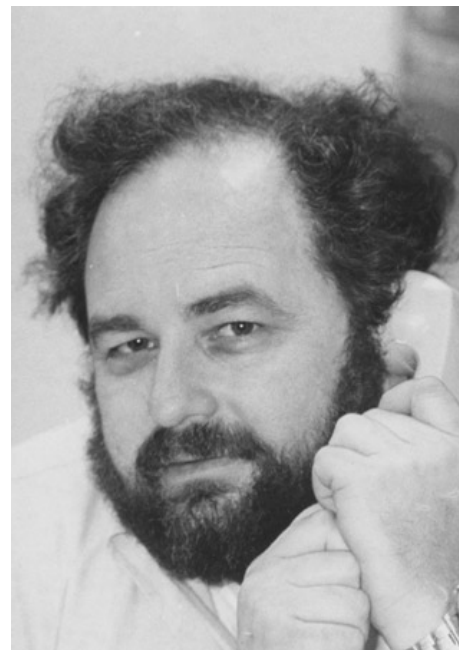


Photo courtesy Popular Communications

the Betty Boop and Popeye cartoons. Tommy's irreverence toward authority and arrogance often came through in his columns. Once taken to task for criticizing a long-standing radio organization, he responded, "I don't care when it was founded, I just want to know when it will be lost!"

Tommy's irrepressible sense of humor helped him after a bout with polio at age 14 left him with a limp right up until he was confined to a wheelchair a number of years ago.

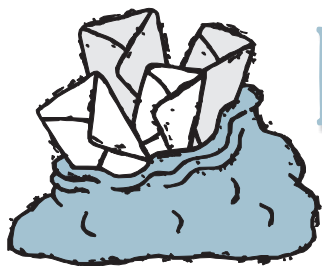
The popular folklore of our hobby had defined my relationship with Tommy as competitive; in fact, nothing could be further from the truth. Tommy and I enjoyed and admired one another's professional contributions and were always on the warmest of terms.

In 2004 he left his native north to move to Deland, Florida – to go fishing with his grandkids, as he philosophically told me. But his afflictions of diabetes and his heart were taking their toll. We lost Tommy Friday, August 22, at age 75, a productive writer whose contributions will be long remembered, and whose reputation was one of which his family and friends can be proud.

—Bob Grove

Editor's Note: Several staff writers expressed their appreciation for Tom Kneitel's influence on their career in hobby journalism in the October 2007 "Letters to the Editor." You can find those earlier tributes on our web page at www.monitoringtimes.com

"Communications" is compiled by Ken Reitz KS4ZR (kenreitz@monitoringtimes.com) from news clippings and links supplied by our readers. Many thanks to this month's fine reporters: David Alpert, Anonymous, Rachel Baughn, Mark Cob-beldick, Robert Homuth, Alokesh Gupta, John Mayson, Jerry None, Doug Smith., Larry Van Horn and George Zeller.



LETTERS TO THE EDITOR

This column is open to your considered comments. Opinions expressed here are not necessarily those of Monitoring Times. Your letters may be edited or shortened for clarity and length. Please mail to Letters to the Editor, 7540 Hwy 64 West, Brasstown, NC 28902 or email editor@monitoringtimes.com
Happy monitoring!
Rachel Baughn, Editor

Spooks, Spies, and other Weirdos

It's October. Our annual focus on "spooks" and the more bizarre side of radio doesn't involve ham radio communications from beyond the grave *a la* the movie "Frequency." Our *spooks* are secret agents receiving coded messages, as in our lead story on England's Bletchley Park – renowned for the part it played in cracking the Nazi's sophisticated, encoded messages during World War II. (For a more modern-day version of encoded military communications, turn to *Milcom* for an exposé of the British "X-Files Radio Net.")

As long as we're in English territory, one mustn't overlook the BBC.

Our feature article about this British institution is not primarily about the *Beeb* of the century just past. Even in its heyday, the BBC's short-wave broadcasts never could have provided the variety of content and regional coverage that one can find today by tuning in BBC's domestic stations on line.

"And now for something entirely different" (a phrase universally appropriated from *Monty Python's Flying Circus*), we really go out on a limb to expose you to radio as *Transmission Art*. You know that rock bands occasionally use shortwave squeals or spy numbers as part of their music. That certainly would qualify as transmission art, but there are more ways of combining art and radio than you've likely ever dreamed of. Check out the feature article by Christopher Friesen and be prepared to have your mind and your ears opened to new (and maybe even weird) possibilities.

By the way, on Halloween tune your streaming audio player to one of the websites mentioned in that article to hear a remix of the Orson Welles' radio theater classic "The War of the Worlds," bringing the classic up to date with current wars. You'll find it at www.free103point9.org Oct. 31, 2008: 10 p.m. – 11 p.m.

And for more on *Monty Python* and all the great comedy shows, political parodies, and all kinds of humor to be found on radio, turn to this month's *Programming Spotlight* column.

Lastly, for truly out-of-this-world reception via the Internet, check out this month's *Global-Net*. It's spooky!

What's Happenin' in CB

"I really enjoyed Ken Reitz's article about CB in the August *MT*!

"I was a CB'er during the craze (The Geritol Hippie) and I must say I had a lot of fun with



it. I mainly talked with the truckers as I traveled down the highway but I did other stuff as well. Alas, I had a unit stolen from my car and that ALMOST ended my interest in CB.

"It was very entertaining to listen to the antics of Barracuda, QP, Sledge, Paradise, Towerman and others as they bitched, threatened violence, discussed love lives, planned the pinning of the cox of others, threw dead carriers and all sorts of other BS, often in various stages of inebriation. I would listen in almost daily. It was quite a show!

"Those days are over, but from time to time, I still tune the CB frequencies just to listen in (watergate'n as they used to call it) and once in a while, something worthwhile turns up.

"Again thanks for the article. It brought back memories!"

– Mark Burns

"I just want to take a minute to say that I enjoyed your article on CBs. Always nice to rehash the basics on any subject. That brings me to a question or two.

"Is Midland Radios having 'troubles'? What I mean is, I have a brochure on their CBs and wx radios and was looking into the model 79-290 CB. On the web site, out of all the CBs they have, only one is available. And that is the cheapest model of all. I tried to contact someone by e-mail but never received a reply (well over two weeks ago).

"So if you have any info on Midland or the model radio I mentioned let me know. It would be nice."

– Jeff Rehm

"Thanks for writing! Midland, like all other companies in the communications business, is going where the money is and that's not CB radio. They've pared the CB product line down to the essentials: one "full sized" CB set and two hand-holds.

"The bulk of their effort in consumer electronics is in FRS/GMRS radios. Their share of the Land Mobile Radio service, VHF Marine service, WX radios and government contracts for base stations, repeaters and telemetry (2-way data radios) gives them all the business they can handle and, I'm sure, keeps a good number of

Chinese factories going. I would have to say that Midland Radio is doing quite well.

"The product you mentioned, 79-290, is listed as out of production. There just weren't enough sales to justify continued production. However, I believe you may be able to find this unit in some retail outlet somewhere if you look long enough. SSB CB sets were never very popular with the general public and sold poorly.

"This will give you an idea of what CB is up against: Last year the FRS/GMRS unit sales topped 10 million units according to the Consumer Electronics Association (a trade industry that tracks such data). CB sales were so small, they aren't calculated. FRS/GMRS is where the money is.

"Hope this answers your questions. Thanks again, Jeffry, for writing. Always good to hear from *MT* readers!"

– Ken Reitz KS4ZR

Internet Not an Option

"The articles in your magazine are very interesting. However, at the end of each paragraph is a web site listed for more info.

"For me, that's not a great option. Web access is expensive here in the rural area where I live. Nearest library 12 miles, and with gas prices what they are ...?

"There's not much I like about surfing the Web. I'd much rather spin the dial on my radio gear and pull in a weak but readable signal. Now that's exciting!

"Maybe some day there will be no articles to read in the magazine, just website listings; how sad."

– Craig Campbell

Craig, we understand your problem. Brass-town is also in a rural area, and it was *Monitoring Times* and Grove Enterprises who brought the first internet connection to our "forgotten counties of Western North Carolina." We gave the internet connection free to schools and libraries, and operated at a loss in order to get *MT* and the Grove catalog on line.

So, while we are all about the love of twisting the dials, we also recognize that the Web is here to stay and we may as well use it to complement our hobby. You may be right: some day the magazine may complement the internet instead of the other way around.

On the other hand, paper magazines and radio broadcasts and communications will never be completely replaced by the internet. So as long as there are folks like you who rely on a magazine they can hold in their hands, and a radio which doesn't require a connection to the world wide web, *Monitoring Times* will continue to provide "interesting articles" that keep a foot in both worlds.

Signals, Subterfuge and Deception

High Drama at Bletchley Park

By Roy Stevenson.

Known as Station X or the National Codes Center, the Bletchley Park Museum offers a unique insight into the fascinating world of military decoding in World War II. Even today, as you walk around the expansive 28-acre grounds, you'll gain an appreciation of the staggering resources the British and American military sank into decoding German and Japanese codes and ciphers.

A Top Secret Facility

When this top-secret facility operated at full strength in World War II, 8,500 people worked in what was then a 55-acre sprawling complex, with another 1,500 persons at nearby locations. It's easy to imagine them hustling and bustling about in their uniforms or civilian dress, in a frenzy of activity.

With a population density of 145 people per acre, it was ironic how little they communicated with each other, as all were sworn to secrecy. Some married couples worked in different huts, and may never have known until after the war that their partner also worked there.

Only a 40-minute train ride north of London in Milton Keynes, Bletchley Park is a five-minute walk from the train station. Winston Churchill came here officially on one occasion, but secretly visited the park several other times, using a secret underground tunnel from the train station to the center.

High Drama

Bletchley Park witnessed all manner of high drama: romance, subterfuge and deception, top secret decoding, an eclectic mish mash of per-

sonalities including chess masters, Oxford and Cambridge mathematicians, crossword puzzle experts, scientists, engineers, WRENs, high-ranking military personnel, signals experts and others, all combining their code-breaking efforts to shorten the war. This is the stuff that movies are made of, so it is not surprising that one was filmed about the park.

Unfortunately, the movie *"Enigma"* deviates from reality right across the board, taking many liberties with factual truth. The film's main character portrays real life code breaker Alan Turing having a romantic affair with a woman working at the park. This was highly unlikely, as Turing was gay. It also reveals one of the women working there as a German spy, collecting code-breaking secrets to hand on to her masters in Berlin. In reality, the Germans had no idea whatsoever of the activities taking place at Bletchley Park. However, the film is worth watching for its entertaining storyline and realistic portrayal of the stressful conditions at Bletchley Park.

The Personalities

With the combination of genius code breakers and the characteristic British eccentricity, Bletchley Park had more than its share of strange people and odd behavior. "About half were absolutely mad," according to one of the women who worked there. Grand Chess Master Hugh Alexander was recruited and became one of the most brilliant code breakers at Bletchley Park. Other famous chess players of the time including Stuart Milner-Barry, and Harry Golombek followed.

Some decoders were recruited by their ability to complete the *Daily Telegraph* newspaper's crossword puzzle. Mr. Stanley Sedgewick appeared at the *Daily Telegraph's* offices in response to an invitation for members of the public who could solve crossword puzzles in less than 12 minutes. Taking a test, he was one word short at the 12-minute mark, but several weeks later received a letter asking him to appear at the Military Intelligence offices. After some training he and some other expert crossword puzzlers found themselves on staff at Bletchley Park.

The Museum Tour

Your tour starts in Block B, where the ticket office is located. A range of excellent books about the park and its code breaking history are found behind the front desk along with the souvenirs. A hand-held audio guide leads you on an absorbing self-paced, self-guided tour of Bletchley Park. Academics worked to break the codes for the Lorenz machine in Block B offices.



Continuing through Block B, "The Bletchley Park Story" is an introductory museum with multiple display cases exhibiting coding machines, German Enigma machines, Enigma machine rotor wheels, a message delivery motorbike, a recreated office, the historic last intercept message before Bletchley Park closed down at the end of World War II, and a TypeX British Coding Machine used by the Royal Air Force from 1938 on. The TypeX codes were never broken by the Germans, but interestingly, were modified to Enigma settings and used to decode the Enigma messages.

More displays are found upstairs in Block B. For nostalgia fans, a Home Front House display with typical World War Two era kitchen, dining room, and schoolroom will bring back memories.

The Y Stations

A Y Station Outpost diorama shows signal receivers listening in on German radio messages. These radio intercept experts were





located all over England at secret Y Station locations. They wrote the intercepted German messages down and forwarded them on to Bletchley Park for decoding.

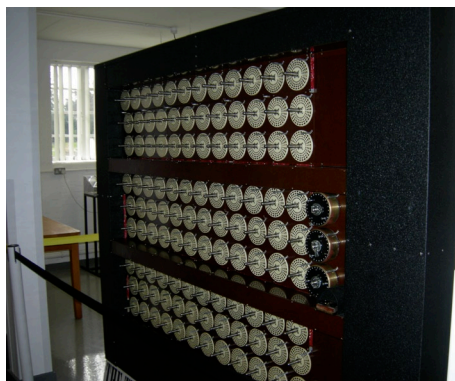
On one occasion, a Y station operator intercepted a message in plain language. The German control station kept saying “in code, in code” to the recipient, who replied “the Tommies are outside the window,” meaning he was about to be shot or captured by British troops.

Y station operatives became so practiced they could often detect the exact German signallers from their “touch” on the Morse code keys. When the signaller appeared again at a different location, the Y operatives were able to deduce where his unit had moved.

Other fascinating paraphernalia in glass display cases include children’s gas masks, newspaper headlines, weapons, medals, Nazi armbands, SS daggers, model aircraft, personal military items such as cigarette tins, and emergency rations. Professionally designed dioramas include a typical German Radio Signals Unit, complete with uniformed models at work in a fully equipped bunker.

Turing’s Bombe

A full size mock-up model of Turing’s Bombe stands proudly in another room. These machines were designed by mathematics genius Alan Turing to speed up the code-breaking process. The “Bombe” has Enigma-like rows, with drums to represent the rotors. Women’s Royal Naval Service (WRENs) operators set up the Bombes from plans provided by code-breakers.



The Bombes found the Enigma settings through trial and error, thus helping break messages faster. The display replica of the Bombe was actually used in the making of the film “Enigma.”

The Enigma Machines

The history of the Enigma machine is revealed in a series of reader board displays. The genesis of the Enigma began in 1915 when two Dutch Naval officers invented the first cipher machine that incorporated moving rotors. A Dutch businessman, Hugo Koch, took out a patent for a similar machine in 1919. In 1922 Koch shared his patent rights with the German company Scherbius and Ritter, who began to manufacture their first cipher machines.



The German navy began using the Enigma machine in 1926. The Poles had some initial success in breaking the Enigma codes. But the real breakthrough came at the end of December 1932: With information derived from espionage combined with brilliant mathematical work, Polish mathematician Marian Rejewski was able to discover the secret wiring of the rotors. His work would pave the way for the successful breaking of the Enigma machine codes later at Bletchley Park.

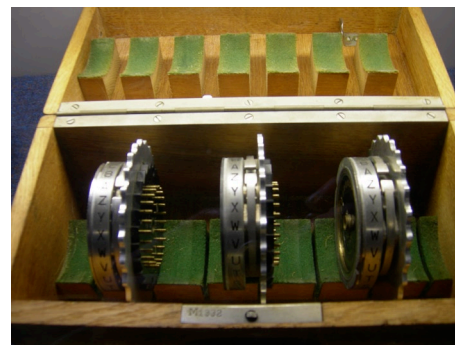
It was just in time: When Hitler became Chancellor in 1934, he was quick to exploit the military capabilities of the Enigma machine, and breaking the codes became both more difficult and more critical.

Alastair Denniston, head of the Government Code and Cypher School, brought to Britain an Enigma machine that had been recreated by the Poles. Bletchley Park was set up as the hub of all wartime intelligence starting in 1939 with Denniston as its first head. Churchill referred to the park as his “Ultra Secret,” and the secret intelligence gathered here was known as “Ultra.” Bletchley Park became known as “Station X.”

For the remainder of the war the Germans never had any idea that most of their secrets were being read at Bletchley Park and passed on to Allied commanders in the field. Secrecy was preserved so well that mail delivered to the tiny post office at the park was actually transported to a London post office and mailed from there. It was not until the mid-1970s that the true nature of Bletchley Park became publicly known.

How Enigma Works

Another display in Block B explains how Enigma works. It operates by generating an electrical impulse that is activated when a letter on the keyboard is pressed. There is a “clunk” as the letter is pressed down. The route taken by this electrical impulse is determined by the way the machine is set up using the rotors (wheels) in the machine, and by a plugboard you can see on the front of Enigma machines. The electrical impulse passes through a combination of these plugs and rotors, hits a

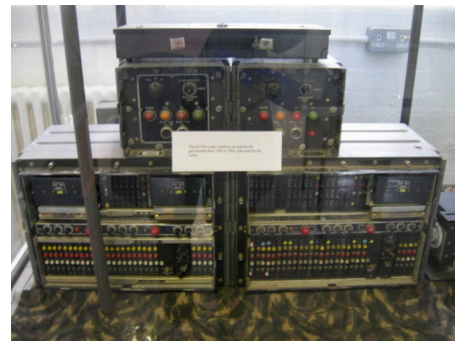


reflector, goes back through the rotors and finishes by lighting a lamp to indicate the enciphered letter. Told you it was simple! (See February 2006 feature by John Catalano for a more detailed look at how Enigma operated - ed.)

Breaking the Codes

The first wartime cipher broken at Bletchley Park was in January 1940 by means of the newly completed “Jeffreys sheets,” based on a technique originally invented before the war by a Polish mathematician Henrik Zygalski. This was the “Green Code” used by the German Army administration. The same team then cracked the “Red Code” used by the Luftwaffe liaison officers to co-ordinate air support for army units. In April 1940 they broke the Enigma “Yellow Cipher,” revealing the invasion plans of the advancing Germans into Denmark and Norway.

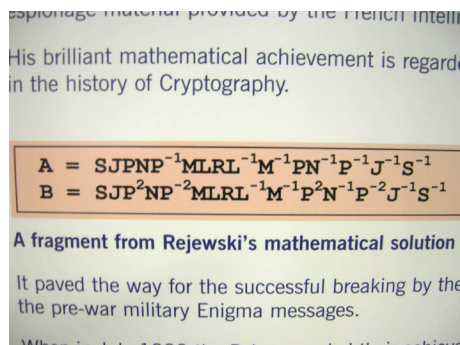
The first Enigma decrypt (deciphered message) was issued on Christmas Day 1941. By the end of WWII, over 140,000 decrypts had been circulated.



Colossus

Perhaps Bletchley Park’s greatest success was the creation of the Colossus, the first electronic programmable computer, built by Tommy Flowers and a team of post office engineers in December 1943. This device enabled them to break the German teleprinter ciphers. This massive computer was 16 feet long, 12 feet deep and about 8 feet high. Despite claims made by American scientists and mathematicians in the 1950s, Bletchley Park was the site of the first computer. But, because Colossus was kept secret until 1975, the British were not able to refute this American claim.

To give some idea of how far computers have developed since then, the original (Mark 1) Colossus had 1,500 valves (tubes), and the Mark 2 had 2,500 valves. With the evolution of computers, transistors replaced valves, and the microchip in turn replaced transistors. One



modern microchip is now capable of performing the same tasks that Colossus did in the 1940s.

The Colossus enabled the code breakers to decrypt Hitler's and other party officials' messages so effectively that it only took 30 minutes to decrypt their messages. It took Hitler's own subordinates an average of 2 hours to decrypt Hitler's messages – They could have saved time by telephoning Bletchley Park!

In May 1941 the capture of the German weather ship *Munchen* and of U-boat *U110*, provided sufficient information to enable the code-breakers in Hut 8 to read German naval signals within a few hours of their transmission. This led to spectacular success with tracking the U-Boat Wolf Packs in the Atlantic, thus saving a large number of merchant ships from being sunk.

The Decryptions-Some Figures

Decrypts of the Abwehr Enigma made a major difference to the Allied War Effort, especially the D-Day landings on Normandy beaches. Following the D-Day landings, up to 4,840 messages were being deciphered daily by the 8,600 Operatives at Bletchley Park. Of these, 2,000 were naval decrypts and about 2,500 army and air force decrypts. Additionally, by breaking the German codes, the British were able to divert German reinforcements away from the landing beaches.

History of the Mansion

Government agents from the Code and Cypher School leased the manor from Captain Hubert Faulkner in 1938 when war with Germany appeared imminent. This location was chosen because Milton Keynes is located midway between Oxford and Cambridge Universities, which were the preferred recruiting grounds for mathematicians who were enlisted to break the codes. It's also close to the railway and road lines to London.

The mansion has an interesting red brick mixture of mock Tudor and Gothic architectural styles. Started in the 1870s, it was continually added to, hence the contrasting architecture. It looks out over a small lake. Exploring the mansion is a delight. Its ornately furnished interior features huge fireplaces, elaborate ceilings and staircase, immaculate wall paneling, a ballroom, and a small library with beautiful wooden bookcases. As you wander through you'll also see a bust of Winston Churchill and a plaque describing the manor's role as a code breaking headquarters.

Motorcycle Messages and a Stray Bombing

A brick sentry box behind the manor was where hundreds of motorcycle dispatch riders brought coded messages in from the "Y" Stations around England. There would be up to 3,000 messages per day, about 40 riders per hour.



Opposite the sentry box is Hut 4, just behind a small copse of trees. Hut 4 was the only part of Bletchley Park that was bombed in WWII by a stray Luftwaffe bomber, shifting it slightly off its foundations. This was some feat, as Hut 4 is 145 feet long and 30 feet wide. The maintenance crew jacked the hut up and slid it back onto its foundations, apparently while the naval code breakers were still working inside.

The Radio Room

A turreted tower at the back of the mansion was a small radio room used to maintain contact with British Embassies in Europe between August 1939 and January 1940. When the signalers realized the Germans could locate Bletchley Park by tracing the radio messages or visibly seeing the lengthy aerial, they relocated it to Whaddon Hall, 7 miles away.

Continuing the Tour

After seeing the mansion, you'll come to the former stable block and cottages. Cottage Number 3 was where Alan Turing worked with a team to break the Enigma codes. Then you'll come to some dilapidated, peeling wooden huts. These were the sites of some historic moments in code breaking. The hastily built huts were crowded, cramped, drafty, and very cold in winter. Secret code papers were found stuffed in cracks in the walls by the clean-up crew in 1946.

The huts were utilized in pairs. Hut 6 was



where the attempts to break the German Army and Air Force Enigma took place. The decoded messages were then forwarded to Hut 3 for translation and analysis.

Alan Turing used huts 4 and 8 for processing Naval Enigma codes. Decryption took place in Hut 8, and translation, analysis and retransmission to the Admiralty took place in Hut 4.

Hut 11 was where the bombes, designed by Alan Turing, were placed. This hut was designed to last, with two-foot thick walls and interlocking concrete slabs on the roof.

F and H Blocks housed Colossus machines, which were used to break Lorenz, the cipher machine used by Hitler and his general staff. This hut was demolished in 1987, so only the foundations are visible today. D Block was constructed for the overflow of Huts 3, 4, 6 and 8. Intelligence planning and decoding for the Normandy Landings took place in these buildings.

G Block was used to break the Abwehr code and monitored the D-Day deception plans. E Block provided the center for all outgoing decrypted and translated messages. They were then re-coded on the Type X machines and transmitted to the Allied commanders.

As you walk around this collection of old weather-beaten huts and antique machines, you'll be left with a healthy respect for the ingenuity and doggedness shown by the British and allied codebreakers in this once bustling center of intrigue. History was changed here, and a deadly war that once threatened England's shores was shortened by what happened here. **MT**



BIBLIOGRAPHY

Britain's Best Kept Secret. Ultra's Base at Bletchley Park. Ted Enever. 1994.
Station X. The Codebreakers of Bletchley Park. Michael Smith. 1998.
Enigma-The Battle for the Code. Hugh Sebag-Montefiore.
Colossus-Bletchley Parks Greatest Secret. Paul Gammon.
Unraveling Enigma. Maurie Freedman.
www.bletchley-park.org.uk
www.enigmahistory.org
 Readers may also remember John Catalano's article on the workings of the Enigma machine in February 2006 *Monitoring Times*.

About the Author:

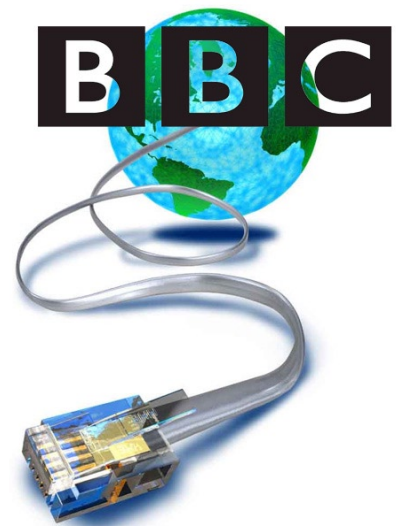
Roy Stevenson is a freelance writer based in Seattle, Washington. He writes on Military History, Travel, Sports, Fitness, and Film Festival Reviews. He can be reached for comment at roy_stevenson@hotmail.com

“Click Twice for the Beeb”

BBC: More Than a World Service

Online content opens up the rest of the BBC to the world

By Loyd Van Horn – W4LVH



For many of us, the BBC's World Service broadcast was one of our first introductions into the world of international broadcasting.

For me, it was the thrilling realization that the programming I was listening to was actually coming from half the world away. It was hearing Christmas broadcasts on Christmas Eve, when it was already Christmas Day in England. It was closing my eyes when the announcers (or *presenters*, as I later learned the BBC called them) discussed local matters and then trying to visualize what life was like in the communities they named. Fantastic places such as Manchester, Liverpool, Essex, Suffolk and Newcastle were no longer just dots on a map; they were real and vibrant places to me. When my BBC QSL card arrived shortly thereafter, I knew I was hooked.

A few years later when Operation Desert Storm was in full swing, it wasn't CNN or my local television station I turned to for the most accurate and vivid details of war in the desert. Once again, I tuned my shortwave radio to the BBC.

As dependable as Big Ben's hourly chime, the BBC's World Service has served as the gold standard for bringing information to listeners around the globe during times of breaking news and war for more than 70 years. But for many of us, those international broadcasts were the only side of the British Broadcasting Corporation that we ever could hope to experience, short of traveling to the English isle itself. What we didn't know was that we were missing some truly amazing programming.

That is because the BBC is more than world news and commentary. It is also an entire system of radio channels, each carrying distinct music, sports and information programming for an audience of millions of Britons. It is also a network of locally targeted radio stations, each providing a personal glimpse into the communities they serve. It is also a collection of television stations that operate to provide not only news and information in the proud tradition of the BBC, but cutting edge and innovative programming that is imitated and copied by television producers around the world.

Wish that you could be in on the fun? You don't have to feel like you are missing out. Thanks to Internet streaming technology,

almost all of the BBC's services can now be a service to the world.

The “Beeb” through the years

Over its more than 80-year history, the implementation of the BBC's Web streaming products is just one in a long line of technological advances where the BBC has been in the forefront.

The origin of the BBC (sometimes called the “Beeb” after a famous Peter Sellers sketch on *The Goon Show*) dates back to the birth of radio in the early 1900s. After failing to gain much support in his native Italy, the father of radio, Guglielmo Marconi, headed to England to test the use of radio waves as a means of communication and delivery of entertainment. Through Marconi's efforts, the effectiveness of radio was soon realized, and Britain's first official radio station, 2LO, was on the air. Soon thereafter the British Broadcasting Company was created, the first incarnation of what we know today as the BBC.

The decision was made in the early years of broadcasting that the BBC would be an entity to educate, inform and entertain the British listening audience, with an independent voice that was free of commercial and political influence. It was this foundation that would give the BBC its worldwide credibility as a news source for years to come.

The BBC witnessed further technological advances in the 1930s with the introduction of

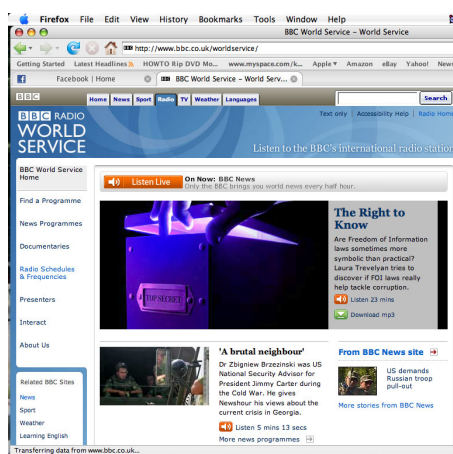
television. It was the BBC, in fact, that began the world's first regular television broadcasts. Soon, the BBC was broadcasting royal coronations, Wimbledon coverage, and of course, the occasional game of football (*soccer* for us Yanks). It was also in the 1930s that the BBC began broadcasting what would later become the World Service on shortwave. It was a service that would soon be tested by a war that shook the world.

With the outbreak of World War II, the BBC shut down television operations, making radio the country's only source for up-to-the minute information on Britain's war efforts. When listeners at home weren't hearing cutting edge “from the field” war coverage, they were being entertained with programs aimed at keeping morale high among the citizenry. It was the BBC's accurate and honest reporting of news during the war that helped secure its news service as being among the best in the world.

While radio was the king during the war, it was a newly crowned queen that would change the face of broadcasting in Britain just a few years later. Nearly 22 million viewers crowded around the television sets of friends and family across England to see Queen Elizabeth II's coronation on June 2, 1953. Afterwards, there was a rush of viewers to obtain their television license. (In Britain, in order to own a television, a television license must be purchased. The income from the purchase of these licenses makes up a large part of the funding of the BBC's various services.) A new dominant media outlet was emerging and as interest in television grew, the BBC expanded its programming and content even more.

The BBC continued to bring more services to their listeners over the next few years, partly motivated by competition and partly motivated by further technological advancements. (Another television service, ITV, surfaced in the 1950s, forcing the BBC to keep its programming fresh and relevant.)

British radio audiences were able to hear their music in full stereo with the advent of FM broadcasts in the late 1960s. Earlier that decade, as the government sought to stop the flood of pirate radio stations that were popping up off the coast of England (including the famous Radio Caroline), the BBC formed Radio 1 as a primary source for the hit music of the day.



In addition, local BBC radio stations began starting up across the country, with nearly 20 in place by the end of the decade.

British television in the 1960s was a revolutionary force in its own right. With the so-called "British Invasion" of bands achieving success in America following the explosion of Beatle mania, music even left the confines of the radio and became a television staple with the introduction of "Top of the Pops" in 1964. The show featured a performance from the band with the number one single each week and it became required viewing by millions of Britons each week. During the more than 40 years of the program's run, nearly every major band to come out of Britain was featured on the show.

Another leap for television in the 1960s came with the advent of color. With the popularity of television rising steadily in Britain, the BBC introduced the colorized BBC Two in 1967, offering Britons another choice of programming from the "Beeb." In addition, the same Beatles that paved the way for the British music boom in the early 1960s, were also part of the first worldwide satellite television broadcast. The "Our World" broadcast brought musical performances from various countries to viewers worldwide, with the Beatles and the BBC teaming up for Britain's portion of the historic event.

The BBC faced more competition from commercial outlets beginning in the late 1970s. As more options came along for British audiences, the BBC continued to evolve both the amount of products and services they offered, and the type and quality of programming.

More military conflicts gave the BBC a chance to flex the muscle of its news gathering service. Combat action from Vietnam in the 1970s, Grenada and the Falklands in the 1980s, and Operation Desert Storm in the 1990s were brought right to the eyes and ears of British audiences through the UK services, and to the world through BBC Worldwide.

In recent years, the BBC has been in step with the digital revolution. In addition to supplementing and updating their broadcast signals with digitally based transmissions, the BBC has turned their online presence into one of the most viewed Web sites in the world since its inception in 1995.

It is that Web site, a treasure trove of programming and interactive content, that we will explore in further detail.

BBC.CO.UK – The ground level

As the front door to the world for the BBC, the main home page offers visitors a way to get their news, sports and weather information with a quick glance. It also serves as a springboard to the BBC's many radio and television products. A recently added feature allows visitors to customize their bbc.co.uk experience to see only the information they want.

Want to only receive news headlines, the latest in music, and what's new in BBC television? Want it in a comforting teal color scheme? Your customizations can be only a few clicks away.



A little further digging on the main home page can offer information on how to obtain BBC news and information via your mobile phone, a detailed history of the BBC, and a full A to Z index of everything the BBC offers online.

But what can you see, hear and interact with? Where can you find it? Let's take a look.

BBC RADIO

BBC Radio - bbc.co.uk/radio

For those who are looking for live streaming audio of the BBC's radio broadcasts as well as an on-demand archive of recent programming broadcasts, the BBC Radio page is the site to bookmark. From here, you can access a plethora of BBC audio from music and local stations to international broadcasts in a variety of languages.

BBC World Service -

bbc.co.uk/worldservice

The BBC World Service streaming products include the live traditional shortwave broadcast that global listeners have come to know so well over the years, as well as the BBC's international broadcasts in 33 different languages such as Arabic, Spanish and Russian. Some of the World Service's programs and documentaries can also be found here, as well as links to podcasts, RSS feeds and information on the various World Service presenters. Shortwave listeners can also find information on these broadcasts as well including frequency and programming schedules.

BBC Radio 1 - bbc.co.uk/radio1

The BBC's venerable hit parade station's live stream can be found here as well as podcasts of recent broadcasts. Popular music lovers will run the risk of overdosing on the vast amounts of information that can be obtained from this single site. The UK top singles chart, in-depth information on



the movers and shakers in various popular music genres, the Radio 1 playlist and major music headlines can all be found on the Radio 1 homepage. In England, Radio 1 on-air personalities have become established household names, and information on these presenters can also be found here as well as a studio Web cam.

BBC Radio 2 - bbc.co.uk/radio2

Radio 2 is the most listened to radio station in the UK with some of the most powerful FM transmissions in Europe pumping a wide variety of music to millions of listeners. Radio 2's main playlist consists of music from the 1960s through the 1990s and in various programs can play everything from blues, folk, country, funk, classical, gospel and more. While Radio 1 is more of a station for "the kids," Radio 2 is a station for everyone else, but has been gaining an increasingly younger feel to its music over the years. Like Radio 1, Radio 2's presenters are celebrities in their own right and their info can be found on the Radio 2 homepage.

BBC Radio 3 - bbc.co.uk/radio3

Classical music lovers need look no further than Radio 3. Complete with performances from the BBC's own concert orchestra, Radio 3 picks up where the classical and jazz specialty programs of Radio 2 leave off. Listeners can also find a healthy dose of new and world music on Radio 3, as well as spoken word readings of prose, interviews and drama readings. As with all of the BBC's online products, a live stream and wide assortment of downloadable podcasts can be found through Radio 3's main page.

BBC Radio 4 - bbc.co.uk/radio4

If Radio 2 is the top draw for music lovers, then Radio 4 is where Britons turn for news, drama and talk. Radio 4 is Britain's second most listened-to station and was named UK Station of the Year for 2008. How important is Radio 4? In the event of nuclear war or other such cataclysmic emergency that would force the stoppage of all other broadcasts in Britain, Radio 4 has been designated the official national broadcaster and would continue to provide updated news and information to a nation in turmoil. Many of the programs that are featured on Radio 4 had their start on the BBC Home Service before it was restructured into Radio 4 in 1967. Listeners can find news and current affairs programming, science and history, arts and drama and what Radio 4 calls "factual" content. This includes discussions on social issues, food and leisure programs and more.

BBC Radio 5Live - bbc.co.uk/fivelive

Britain's home for live news and live sports, 5Live covers everything from cricket and golf to Britain's national obsession - football. Unfortunately for online listeners, some of the live sports broadcasts are not permitted to be transmitted online. But there is still plenty to hear online, especially for those who enjoy talk radio. Live news broadcasts, talk radio programs with callers from across Britain and sports commentary on nearly every major sport that takes place on British soil offer a unique glimpse into what could be the standard pub conversations of the day.

Asian Network - bbc.co.uk/asiannetwork

Aimed specifically at Britain's large popu-

lation of those hailing from the Asian continent, this series of both traditional and digital broadcasts offers a glimpse into British Asian life, music, sports, issues and culture. The Asian Network officially began operations in 1996, but the beginnings of its content can be traced back to the late 1970s.

LET'S GET DIGITAL

In addition to the five mainstream UK broadcasts and the Asian Network, there are several digital-only broadcasts that are also streamed online.

1Xtra – bbc.co.uk/1xtra

The digital sister station to Radio 1, 1Xtra specializes in urban music with an emphasis on hip-hop.



6Music – bbc.co.uk/6music

Bringing alternative, independent and classic rock to the forefront, Radio 2's digital sister station focuses less on music climbing the charts and more on the music that the audience itself wants to hear. Audience interaction through phone and message requests is encouraged.

BBC 7 – bbc.co.uk/bbc7

Comedy, drama and the spoken word are what you will find on this digital-only station. In addition, the kids can find a healthy dose of programming for them as well. In addition to contemporary content, listeners can also hear archived programs from deep in the BBC's extensive vault. Fancy a laugh?

5Live Sports Extra – bbc.co.uk/5livesportsextra

More sports commentary and broadcasts provided as a digital-only, part-time addendum to 5Live's sports broadcasts. As with 5Live, some live sporting events cannot be streamed online.



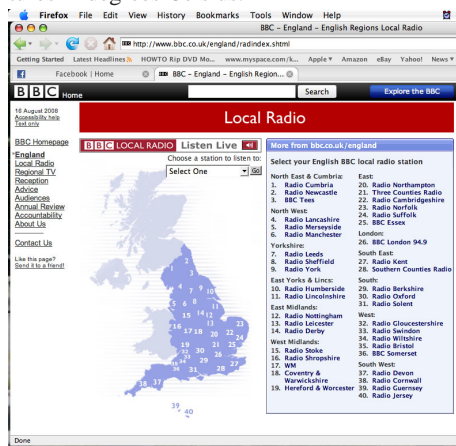
BBC LOCAL RADIO

Local and regional stations can be found at the BBC's one-stop page, bbc.co.uk/England/radindex.shtml. A total of 40 local and regional

stations from across Britain and the Channel Islands can be found here, each providing news, talk and music aimed directly at the local residents. Presenters are allowed to speak with accents reflecting the region from where they are broadcasting, giving each station its own unique feel, specific to its city.

A tip for those listening from America: remember the time difference between you and Britain when listening for specific programs. One of my favorite things to do is to listen to the morning shows in various cities, especially Manchester, Liverpool (BBC Radio Merseyside) and the northernmost areas (such as BBC Radio Cumbria and BBC Radio Newcastle). But to hear these live, I have to stay up until at least 1 a.m. EDT. It is worth losing a little sleep to listen in, however.

As a former morning show host myself, it is fascinating to hear the differences between local American and local British morning shows. What may seem mundane when placed in the context of our own daily lives (traffic reports, for instance) can be suddenly a fascinating glimpse into the life of a whole other culture. Where else are you going to hear detailed discussions about the nightlife in Essex or the housing market in Lancashire? Also, don't forget those weather forecasts are going to be given with temperatures in degrees Celsius.



For the person who wants to place themselves in the daily life and culture of a town half the world away (or for those in Europe, just around the corner), the BBC's local radio broadcasts are a way to travel the whole of Britain, without ever leaving your home or office.

BBC TELEVISION

BBC International Television – bbc.co.uk/tv

The only commercial broadcast enterprises you will find under the BBC umbrella are found here. These include some popular channels that many satellite and cable subscribers in the U.S. and around the world are already familiar with. All of them offer a vast amount of programming content on their Web pages. The profits from the operation of these channels are also used to help fund the BBC's public services, in addition to the license fees.

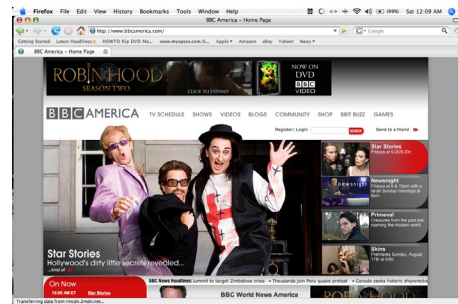
BBC World News – bbcworldnews.com

The BBC's 24-hour breaking news and information channel. While no live stream can be found here (as with all BBC Television con-

tent) one can find breaking news information as well as specialty content and features. Also, schedules of upcoming programming are located on this page.

BBC America – bbcamerica.com

Viewable content abounds on this home for the popular U.S. channel. Programs featured on BBC America change often, but include a mix of popular drama, soap operas, comedy and reality television. A special BBC World News America newscast provides news and information several times a day. Viewers can find a programming schedule and a catalog of popular BBC America videos and DVDs.



BBC Prime/BBC Entertainment – bbcprime.com/bbcentertainment.com

Available to satellite and cable viewers in Europe, the Middle East, Africa and Asia, BBC Prime and BBC Entertainment has a large selection of British drama, comedy and reality programming for the rest of the world. As the channels contain advertising, they are not available in Britain.

Animal Planet – animal.discovery.com

While the BBC sold its stock in the U.S. Animal Planet back to Discovery Communications, it still maintains a 50/50 partnership with the company in international broadcasts of Animal Planet. (In addition, Discovery Communications partners with the BBC for the People+Arts channel and in distribution and advertising sales for BBC America). Animal lovers can find a wealth of content devoted to both wild and domesticated animal issues on this Web site.

People+Arts – tudiscovery.com/web/people-and-arts

A mixture of British and American reality television and series, aimed at Latin America and the Iberian Peninsula. Programs are either subtitled or dubbed into the local language.

UKTV Australia – uktv.com/au

British television for Australia and New Zealand. Much of the programming content comes from the BBC archives and includes drama and comedy series as well as soap operas. As of press time, no viewable content was available through the Web site, but information on the some of the programs featured on the channel was available.

BBC Knowledge – bbcknowledge.com

No longer a cable or satellite channel available in the U.S., BBC Knowledge features science and historical documentaries for viewers in select countries. In addition, a BBC Knowledge magazine is in the works for the U.S. Some program information is available through this Web site as well as a programming schedule, specific to the region where the viewer will be viewing the program.

BBC Lifestyle – [bbclifestyle.com](http://bbc.co.uk/bbclifestyle)

Available in select countries, BBC Lifestyle's programming focuses on issues dealing with home, food, family and life. As with the BBC Knowledge site, some program information is available in addition to a programming schedule.

THE TELLIE IN THE UK

In addition to the internationally broadcast commercial channels, the BBC operates an assortment of television stations in the UK that are funded primarily by the license fee. These sites tend to offer a lot of program information, complete with viewable content and programming schedules but, unlike the BBC Radio streams, they do not have a live stream of their broadcast signal. Additionally, most of the video streams or other television programming content that is playable from the various BBC television sites is only available in the UK. An international version is in the works as of press time.

BBC One – bbc.co.uk/bbcone

The original and the world's first regular operating television station, BBC One broadcasts an assortment of entertainment programming and several newscasts throughout the day including *BBC News at Ten*, the most watched news program in the country. The highly popular *EastEnders* soap opera is one of the most watched programs on the channel and through a link on the BBC One web page, fans of the show can obtain a wealth of information, including video clips, cast bios, games and forums from which to debate show topics. Other programs offer similar amounts and types of information through this page as well.



BBC Two – bbc.co.uk/bbctwo

Started in the mid-1960s, BBC Two has long been regarded as a proving ground for cutting edge and groundbreaking programming. Many shows that gain popularity on BBC Two are "moved up" to BBC One. In recent years, with the introduction of the digital only BBC 4 (below), some of the content traditionally found on BBC Two has been paired with the new channel, with some BBC 4 content even being rebroadcast on BBC Two. Like BBC One, most of the programs broadcast on BBC Two have their own online home complete with large amounts of information on the shows.

BBC Three – bbc.co.uk/bbcthree

The BBC's first digital-only television station, BBC Three attracts a slightly younger audience than either BBC One or BBC Two. The channel has a wide variety of comedy

and reality programs as well several drama programs (including spin-offs from popular BBC One programs).

BBC Four – bbc.co.uk/bbcfour

More programming options including music content (live shows, etc.) are available here. BBC Four is a digital-only broadcast station in the UK.

CBBC – bbc.co.uk/cbbc

One of two children's programming options available in the UK. Programming in the CBBC brand is broadcast on BBC One or BBC Two, as well as the CBBC channel. CBBC aims its programming at children between the age of 6 and 13.

CBeebies – bbc.co.uk/cbeebies

The other children's programming brand is aimed at children up to 6 years of age. CBeebies broadcasts on its own channel (which it shares with BBC Four) and shares content on BBC One and BBC Two. In addition, audio programs are broadcast under the CBeebies brand on BBC 7.

WANT IT ALL? THE IPLAYER

BBC iPlayer – bbc.co.uk/iplayer

Rather than juggle all of the various links and addresses for the BBC content you are looking for, the BBC has simplified matters. The iPlayer is a one-stop source for everything the BBC offers online (photo below).

Both radio and television content is accessible through the iPlayer, including direct links to all live BBC radio streams, popular television and radio downloadable content (with some television content only available in the UK) and sports and news highlights. For the person looking for everything the BBC has to offer, this is the one page to bookmark.

DXing Versus Content

The debate on the future of the hobby continues

While there are exceptions, most of us didn't get into DXing so that we could accumulate massive amounts of QSL cards. Most of us

didn't care to become notorious as an elusive signal hunter.

Why did we first put hand to radio to tune in far away signals then? It was the thrill of the source. As a child, it was knowing that I could turn on my radio, put on my headphones and tune in a station in Ghana, Germany, or China just about any night I wanted to. It was knowing that from my own home, I had an open ticket to travel the world.

With the advent of the Internet, there was much concern that our hobby would perish. Not only is the world now available on line, but with more and more stations placing their transmissions online, where's the allure of DXing?

The content available through the BBC is a perfect example of why the allure of listening to distant countries is still there. The format from which we travel the world may be different, but the purpose is still the same. While I would welcome the day I could turn on my radio and hear the longwave transmissions of Radio 4 coming through my speakers, I don't have to wait for that event to happen to hear what it would sound like. I can go online, any time, and take a trip across Britain.

As I write these final words, my BBC iPlayer is in the background with the sounds of BBC Radio Manchester coming through my laptop speakers. It is a new day dawning in Manchester and the morning crew is talking about an accident on one of the local roads. From my living room, I am getting a slice of life in one Northern England town.

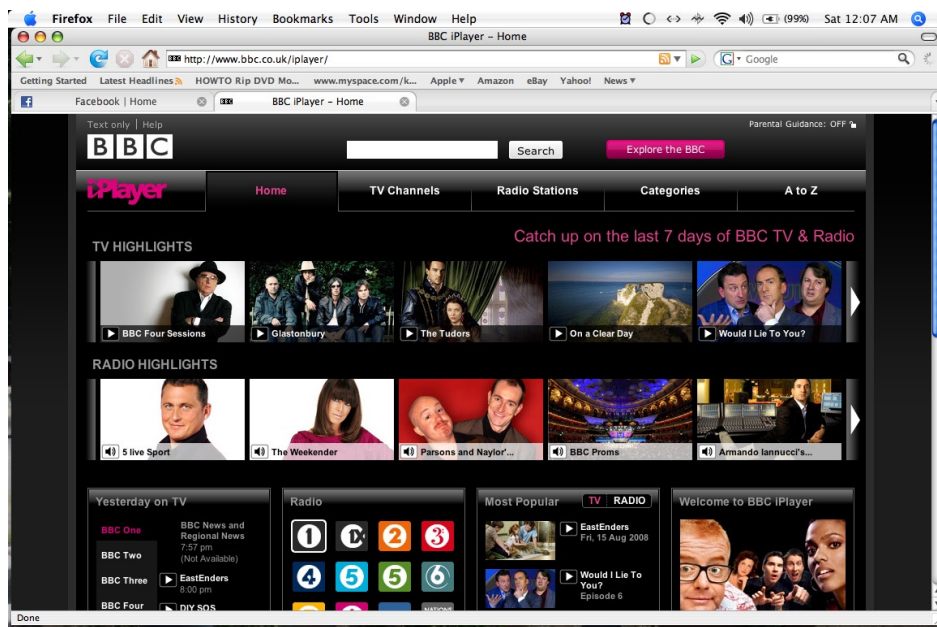
Before I turn out the lights, I may travel to Newcastle and see what the weather is like up there. Or maybe a trip down south to Suffolk is in order.

It is a new day indeed.

About the Author:

Lloyd Van Horn is a writer, designer and former broadcaster who lives in Greenville, SC. He is also a part-time musician, trained storm spotter for the National Weather Service in Greer, SC and an amateur radio operator.

MT



Tuning in to Transmission Art

By Christopher Friesen, VE4CWF

Radio hobbyists have always seen the beauty in radio. From QSL cards, to station schedules and letterhead, to vintage advertisements for household receivers, radio hobbyists will be the first to admit that the world of radio is full of art. The art world seems to be catching on as well, with artists beginning to use radio technology, radio's artifacts, and even the radio spectrum to produce audio and visual experiences that challenge people's perceptions of what radio means in our world.

Originally founded as a mobile micro-casting collective in Brooklyn in 1997, free103point9 is now a nonprofit organization at the forefront of the "Transmission Arts" genre. Galen Joseph-Hunter is free103point9's Executive Director and she says transmission art encompasses a variety of practices, and doesn't always involve broadcasting.

"Works in this genre are often participatory live-art or time-based art, and manifest as radio art, video art, or light sculpture," she says. "Performance-based transmission works harness, occupy, or respond to the airwaves that surround us."

Free103point9 supports transmission art through a variety of programs which include hands-on learning in radio fundamentals and electronics, sponsored events, a regular series of new artistic works released as "Dispatches," and a retreat space in upstate New York called Wave Farm that hosts an annual gathering of transmission artists and others interested in the genre. Currently, they have three artists whose works may be of particular interest to radio hobbyists.

Todd Merrell's Music from the Ether

Todd Merrell is a free103point9 transmission artist who is passionate about music and radio. He traces his fascination with both back to his early childhood. At age eleven, he discovered the magic of shortwave radio while playing at a friend's house. He was so taken by the mysterious, otherworldly sounds coming from the inexpensive tabletop radio, that he and his friend used it to improvise a War of the Worlds radio play which they then recorded on cassette. That experience was the inspiration that would lead him, thirteen years later, to use shortwave radio as a musical instrument.

Merrell is trained as a vocalist and in traditional methods of musical composition but,

in 1991, he teamed up with his friend Patrick Jordan and, using a Hammarlund HQ-145A as well as some audio processing equipment, returned to the idea of making music from the radio. They began performing what Merrell calls "short wave playing" (SWP).

"We played slot frequency, slot depth, crystal phasing, crystal selectivity, antenna polarity, band spread, sensitivity, CW pitch, and audio gain," he says, describing how they used the receiver as a musical instrument for their first recording.



Figure 1: Todd Merrell's "Single Side Band" is his first CD of short wave playing music. (Photo courtesy of Todd Merrell)

Calling themselves "Single Side Band," Merrell and Jordan recorded a composition in two movements they named "SWR." Merrell says it was an experiment that showed him the potential in his idea.

"This piece was at once an exploration of the sonic possibilities of shortwave radio as a musical instrument, but it also served in many ways as a kind of template for developing an aesthetic and a praxis for the making of short-wave music," he says.

Since then Merrell has continued to explore the use of short wave radio receivers as musical instruments. Today he uses a Grundig YB400 for its portability and selectivity, and has worked solo and in collaboration with other artists, producing several other CDs of SWP music. All his recordings are from live performances where Merrell eschews any form of written score in favor of a more spontaneous, site-specific sound that harnesses whatever he finds in his favorite part of the electromagnetic spectrum.



Figure 2: Todd Merrell's latest CD "Nagual" is a collaboration with friends Aiden Baker, and Patrick Jordan. (Photo courtesy Todd Merrell)

"I seem to get the best sounds in long wave and in some AM frequencies, both through single side band (SSB). My old friends are 279 kHz to 283 kHz. Why I get results there is beyond me, but these frequencies have been remarkably reliable. Also 836 kHz and 900 kHz work well for me, but again with SSB," he says.

Merrell never knows what those frequencies are going to give him, but he takes the received sounds and reinterprets them, in real-time, through the use of processing equipment, to produce a meditative, ambient music.

At times, while listening to his music, listeners, especially radio hobbyists, may be able to pick out familiar "radio" sounds, but they will also be surprised by the range and depth of audio tones that Merrell extracts from the ether. Rhythms build, sounds morph, chimes, bells, whistles and percussive elements are all developed from the raw material being broadcast at the time, and Merrell artfully guides all these elements to produce haunting, beautiful, and complete musical scores.

His latest recording, titled "Nagual," is a collaboration with Patrick Jordan also on short-wave radio and Aiden Baker playing an electric guitar. While maintaining the ambient elements of short wave playing, the addition of the guitar gives the four songs on this recording the feel of more traditional music.

For someone who spends so much time listening to a shortwave radio, Merrell admits that he finds it difficult to pursue as a hobby. "Every time I listen to shortwave radio, I want to turn it into music," he says, "The process of tuning in and DXing always introduces fascinating sounds, which I find incredibly inspiring."

Radio Ruido's Homage to Spy Numbers

Radio Ruido's founder, Tom Mulligan, can trace his interest in radio to his childhood as well. On road trips, his father kept a Citizen's Band (CB) radio on, with the volume turned up to high, and Mulligan was fascinated by it. "The CB would be silent for long passes, and then burst out loud," he recalls. "It's probably an early electronic noise experience that has worked its way into my psyche."

Trained as a painter with a Bachelor of Fine Arts from the University of Buffalo, Mulligan began experimenting with sound while sharing a studio space with film and video makers. He

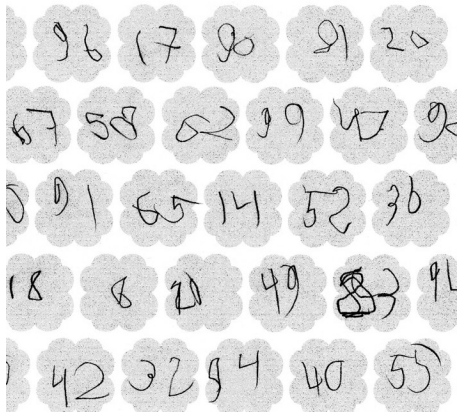


Figure 3: Radio Ruido's "False Rosetta" is an homage to spy numbers stations in a double set of 7" records. (Photo courtesy free103point9)

experimented with feedback from walkie-talkies, and made audio "collages" from oscillator circuits that he processed through a lap-top computer. Mulligan also experimented with microcasting, using a 50 watt FM transmitter, and still hosts a regular streaming on-line program of experimental sound art called "Triangulation."

Radio Ruido's latest work was recently released as part of free103point9's dispatch series, and is titled "False Rosetta." This recording is an audio collage that closely mimics the sounds of "numbers stations" heard on shortwave frequencies. "False Rosetta" is a documentation of the phenomenon of numbers stations, mysterious broadcasts of unknown origin that feature operators reading long lists of numbers. The most prevalent explanation for these broadcasts and one of the most compelling is that these stations are passing coded information to foreign intelligence agents, spies.

This may be true, but it could also be false, and Mulligan's work offers another interpretation: an electromagnetic rosetta, that interprets numbers stations as a benign side effect of our technologically-advanced culture, a culture which spews so much gibberish into the spectrum that we can no longer decipher its original meaning or intent.

"My interest is not so much in 'spy' stations and political intrigue, but in the idea of encoded information," he says describing his work. "And in a set of recordings that, in theory, could be broadcast to simulate numbers recordings that defy translation, or have no translation."

"False Rosetta" was recorded in various locations, and Mulligan asked the vocal participants

to come up with their own code. Many different styles of numbers stations are simulated with both male and female operators, various languages, and even Morse code used. The audio was processed with Mulligan adding sounds of various types of radios to produce the final work.

"False Rosetta" was released on a double set of 7" vinyl records, and Mulligan says the antiquated format complements and completes the entire project. "In a sense, it is a mini DJ tool," he says. "I liked the idea that it could be slowed down and the voice could be remixed and pulled back to repeat itself, creating yet another code from the voices. I also liked the 'artifact' quality of a record. It goes aptly with the archeological reference within the title."

The QSL Cards of Max Goldfarb

Maximilian Goldfarb is a licensed radio amateur and a transmission artist. He holds call sign KC2MIN and, though not very active on the amateur bands, he frequently listens to his scanner, a practice he says has become a ritual in his studio. Goldfarb is not a member of free103point9's core group of artists, but his work "QSL Serial" was recently featured in their "Dispatch" series of releases.

QSL cards, traditionally sent by post, have been used by radio hobbyists since the inception of amateur radio to acknowledge and confirm on-air contacts. They offer a documentary paper trail that remains, once the trail of electromagnetic radiation that carried the original conversation between distant operators has dissipated. Like other

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TEN-TEC

Q. I've been away from scanning for a number of years. Can you recommend a source for frequencies in the Washington, DC area for various law enforcement and emergency frequencies? And I'd also like your recommendation for a hand-held scanner. (B.G., Gaithersburg, MD)

A. You can find a variety of Internet sites for finding collections of frequencies for various locations. Here's one for the DC area: www.davidschoenberger.net/scanning/dc/washington.htm

The main problem, however, is the various types of systems that use these frequencies; it's not like the old days when any scanner with the proper frequencies could pick up anyone on those frequencies.

For example, instead of staying on one frequency, most large systems (like those in the DC metro area) use trunking, which switches back and forth over a pool of many frequencies during just one series of transmissions. To complicate this further, there are three major manufacturers of trunking systems and their variants: Motorola, Johnson and GE-Ericsson.

Another problem is that the FCC has "re-farmed" some of the communications spectrum, changing both the frequency assignments and the bandwidth requirements, making older scanners sound "weaker" because they aren't on center channel, and they don't have narrow bandwidth for extracting the audio efficiently.

Yet another complication is that many systems now digitize their communications so that the old, conventional, analog scanners won't be able to understand the voices even if they track the trunking properly; all they will hear is hiss, and it's illegal to make, buy or own a descrambler for this privacy mode. Fortunately, there is a new, open algorithm system which is in growing use. Digital P-25 is legal to decode and monitor.

Quite a few current hand-held scanners have trunking, narrow banding, the new frequency assignments, and P-25 capability. Grove Enterprises and other MT advertisers stock these. The helpful *Scanning Report* column chart at www.signalharbor.com/trunking.html#scanners will help determine if a scanner is appropriate for the type of trunked system in your area. There is a lot of additional help and advice on Dan Veeneman's SignalHarbor pages and in back issues of his column in *Monitoring Times*, or send him an email at danveeneman@monitoringtimes.com

Q. I recently salvaged the black magnets out of a couple of speak-

ers and attempted to cut them into small pieces and drill holes in them. A hacksaw was useless and I finally had to use a 10,000 RPM metal-cutting disk. What kind of alloy is this? (Mark Burns, Terre Haute, IN)

A. Without seeing the material for myself, I'd guess they were ceramic, since ceramic materials are harder than steel drill bits. But ceramic magnets are also brittle and will chip and shatter like porcelain. As magnetically strong as these ferrite ceramics are, there are stronger magnets yet: samarium cobalt and neodymium alloys.

Q. What is the difference in performance between the discone antenna and the Grove Scantenna? Why do you recommend TV-type RG-6/U coax and F connectors when RG-8/U and LMR-400 are frequently preferred? Can I combine my present Austin Ferret antenna and the ScanTenna with a TV-style splitter for better reception? (Rocco Rivelli, email)

A. Wow, what a great batch of questions! And here are the answers:

The discone has no gain over a half-wave, vertical dipole with wide frequency coverage. Discones are ideal when you need a 2:1 frequency coverage with constant impedance match for transmitting.

The ScanTenna also has wide frequency coverage because of the various parasitic elements that break the continuous spectrum into several smaller bands, but the resultant gain exceeds the performance of a discone.

Outdoor TV coax (RG-6/U) has very low loss, very low cost, small-diameter flexibility, utilizes inexpensive TV-style F connectors which are excellent way past 1 GHz, and have a wide variety of adaptors available for most any communications need. Good adaptors do not add loss to the system, but they must be kept tight and checked for corrosion.

The slight difference in characteristic impedance between the RG-6/U and the other cables (75 vs. 50 ohms) is insignificant in terms of signal loss. It is virtually identical in performance to more expensive, larger, heavier, stiffer RG-8/U.

LMR-400 is much more expensive than RG-6/U, and doesn't really provide an advantage until you have very long lengths (more than 100 feet), and even then only at the higher scanner

frequencies (above 800 MHz).

Attaching two similar antennas in parallel is not a good idea. Depending upon the relative separation between them, the contrivance becomes directional at certain frequencies, never adding more than 3 dB of gain over just one antenna. Worse, it actually decreases signals in other directions, even canceling reception in some directions.

Q. I have a portable Sony receiver ICF-7600AW, but even when I use it with its outdoor antenna (long wire antenna), I can no longer hear any shortwave stations as I did before I moved here from Europe. (Lawrence Kelyaneh, CA)

A. Although it is well noted that west coast U.S. listeners don't have the signal strengths from the strong European broadcasters that east coast listeners do, and that we are at the low null in the sunspot cycle, you still should be able to hear something.

At night or just before sunrise, listen for signals in the 5.9-6.2 and 7-7.4 MHz range; during daylight hours, preferably late afternoon, try 11.6-12.1 and 13.5-13.8 MHz.

If you don't hear anything, it's possible that the little contact in the external antenna jack has been bent so that it isn't properly touching the tip of the plug when it's inserted, and also doesn't correctly touch the other contact when the plug is pulled out. If you are careful, you can bend it to its proper position with a small pick.

If that doesn't work, it's possible that the RF amplifier transistor has been burned out by a static discharge or extremely strong signal level, or that the circuit board was damaged by a fall, perhaps during shipping.

Q. I there any way to receive the police data links on a home computer with a scanner attached? (Phil Payne, email)

A. I'm afraid not. Mobile Data terminals like Motorola's MODAT utilize a propriety system, not in the public domain and rigidly protected by patent rights. As such, it would be illegal for anyone to market such a product.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. Mail your questions along with a self-addressed stamped envelope in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.)

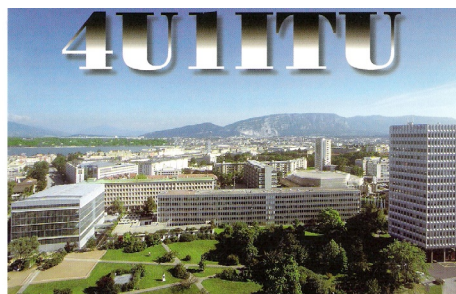
SW, FTA Satellite, and DTV Q&A

We have lots of input this month from readers who have questions about shortwave listening, Free-To-Air satellite TV reception, and their own stories of woe and intrigue concerning digital off-air TV (DTV). First, I'll take a crack at some excellent questions regarding shortwave signals.

❖ World's Frequency Police

MT reader Ted is a U.S. citizen living in Cambodia right now and he asked, "What prevents one country from broadcasting on any frequency they want over the top of another country's stations?"

The short answer is the International Telecommunications Union (ITU), sort of the U.N. of world broadcasting. All ITU member stations agree to abide by the rules regarding frequency assignments and standards set out by the ITU for the various broadcast bands. Since all countries want a clear channel to broadcast their news/propaganda, they all abide, to a point. There are still instances of tit-for-tat jamming heard even today.



QSL card from Club station 4U1ITU at ITU World Headquarters are in Geneva, Switzerland. Here the world body allocates HF band plans and settles international telecommunications disputes. (Courtesy: 4U1ITU)

❖ Mind the Gaps

Ted also wanted to know why certain areas of the spectrum are called "bands" and why there are gaps in between the bands.

That's a really great question. Why not have a shortwave band for international broadcasts that extends from 1.800 MHz to 30 MHz without the interruptions? The reason goes back to the ITU which has to accommodate government, commercial, scientific, and amateur radio use of the same stretch of HF spectrum. To do

this they've marked off chunks of spectrum for each category. To see this in practice, take a look at the official use of HF spectrum granted to the U.S.: www.ntia.doc.gov/osmhome/allochrt.pdf It's actually quite a trick to juggle the limited amount of HF space among all the interested parties, and you have to give the ITU credit for getting as much of it right as they do.

❖ How Much Would You Pay for Better Shortwave Reception?

Finally, Ted asked, "Why would I want to pay \$600 for a shortwave radio when I can have a portable that covers the same spectrum and costs only \$150? What am I missing?"

Radios that tune the same frequencies will do so with varying success, depending on the components used to build the receiver. The proof of the value of a better (i.e. more expensive) receiver is in the listening. For years before I got my first ham ticket, I was an SWLer and used progressively better receivers throughout the period. But, when I tuned the general coverage portion of my Kenwood HF transceiver, which was hooked up to a low-noise, all-band antenna, I was astounded. Even today, 20 years later, that same receiver is able to pick up virtually any HF station printed in the MT shortwave guide at the center of this magazine and it outperforms even the top portables I've tested.

One other consideration is the antenna. Adding a great outside antenna to a modest portable can result in overloading the receiver, as well as introducing more noise than signal. (See *Antenna Topics'* current series on page 62.- ed.) Full-featured, full-sized radios don't even have built-in antennas; it's expected that you'll have a good SWL antenna to attach. And, when you do, the results can truly be worth an extra \$450.



Sangean ATS-606 v. Icom's IC-R75: can there really be \$450 difference between the two? (Courtesy: Sangean USA and Icom USA)

❖ Trimmed Car Antennas

Timothy Kuryla wrote about being able to turn a trimming screw on the car antenna of various cars he's owned in the past to adjust the antenna for better reception on stations he listened to. "Can you tell me why trimmers disappeared from car radios?"

Car antennas have always been a compromise, but once FM radios became standard, the antennas shrunk down to 29 inches, optimum for FM listening but not for AM. Lately, you may have noticed something else about car antennas: they're gone. Most manufacturers are going for hybrid antennas that combine satellite radio, GPS, and pay cell-phone services such as On-Star into one aerodynamic lump on the back of the car's roof.

Many are incorporating folded dipole antennas which are molded into the windshield or rear window – a decades old technique that works great in cities but poorly in the countryside. For manufacturers it speeds things up on the assembly line and no doubt is cheaper than installing motor-driven, telescoping antennas made of steel. Consumers like that they don't break off, forcing them to stick a clothes hanger (which never works) in the vacant antenna hole.

❖ Cheapest Way to FM HD

Morgan Little wrote to note that Radiosophy's HD100, the smallest (and cheapest) HD Radio set available, could be used to take the



Radiosophy's HD100 sold this summer for \$50 with rebate and became the cheapest entry into HD Radio's multicast world yet. (Courtesy: Radiosophy)

audio output into your stereo and so be able to tune in the multicast FM HD channels at very little expense. He also wondered if the rebate price (good only through September) that brought that model down to \$50 perhaps signaled that a new model was pending and perhaps worth waiting for.

Typically, when manufacturers clear out their inventory, they do so at substantial reductions in price. And, that may be the case here. A new generation HD Radio chipset might be in the offing. However, I think it more probably signals a recession and generally poor sales in the industry. HD Radio is slow to take off and the sinking economy isn't helping. But, those who did take advantage of the Radioscopy offer had the cheapest intro to HD FM yet by doing as he suggests.

❖ FTA Satellite TV

Steve Clark read the August *Beginner's Corner* about Free-To-Air (FTA) satellite TV reception and wondered if his no longer used DISH Network dish and LNB could be hooked up to an FTA receiver to tune into FTA programming available on Ku-band broadcast satellites.

While I've covered that question a few times in the past, it's a question that comes up often and the answer is worth repeating. The short answer is no. There are three reasons why neither DISH nor DirecTV systems have anything salvageable for FTA reception:

- 1) They both use a different set of Ku-band frequencies than broadcast FTA receivers use which means that their LNBs will not work either for FTA purposes.
- 2) Both DISH and DirecTV receivers are designed to receive their proprietary, encrypted programming which FTA receivers can't.
- 3) Both DISH and DirecTV transmit very powerful signals, many times those of FTA satellites, which is why they can get by with 18" dishes for reception.

❖ Tales from the DTV Conversion Zone

Recently, two *MT* readers sent in their personal experiences with the conversion to digital off-air TV (DTV).

J. J. Owens (North Carolina) wrote that the built-in NTSC (analog) and ATSC (digital) tuner in his new HDTV set were so poor he could receive only three local DTV stations. He replaced his older VHF-UHF TV antenna with an 8-bay bow-tie antenna advertised for deep-fringe reception and ran a fresh line of RG/6 coax cable for the antenna feed. Then, using his \$40 coupon, he bought a \$50 out-board DTV converter that gave him great reception on all channels within 60 to 80 miles of his house. Unfortunately, the converter box does not output an HDTV signal nor does it have a fiber optic output for surround-sound audio.

Meanwhile, Jim Moodie KA7CIC, from Portland, Oregon, wrote that for 37 years he was unable to get decent analog TV reception even using a tower-mounted antenna, despite being just 10 miles from the local TV towers, owing to the looming presence of a solid lava mountain between his house and the antenna site. Then



This \$60 Digital Stream DTX9950 DTV converter, available from RadioShack, can end up costing you just \$20 (plus sales tax) when you use your \$40 government DTV coupon. But, is it really what you need? (Courtesy: RadioShack)

he bought a Zenith DTT900 converter at RadioShack, attached it to his TV and fed it with a single 8-inch bow-tie antenna that came with a portable TV he once had.

He wrote, "I hung the small bow tie antenna behind the converter box and our jaws dropped in disbelief when I hit the power button: 22 gorgeous, cable quality channels!"

RadioShack reports that the Zenith model has since been replaced by the Digital Stream DTX9950 (\$60). It's eligible for the government's \$40 DTV coupon program, but consumers should be aware that it does not output an HDTV video or surround-sound audio, though it will pass through analog signals that may remain on the air (LPTV, translators and boosters) after the February 19, 2009, cut-off date.

Now that most folks have received their DTV coupons and have had a chance to work DTV converters into their TV systems, I'd like to hear from all *MT* readers who have made the switch.

What's been your experience where you live? Give as many details as you can: make and model of converter; type of antenna used; with or without antenna pre-amp; distance from local stations; success with out-of-market stations, and any other comments. Let me know how reception has improved or decreased. Any comments on the additional content provided by multiplexed channels would also be interesting. I'll compile all results in an upcoming issue of *MT*.

❖ Power Use Update

In the January 2008 *Beginner's Corner* I made a New Year's resolution to use less power. I began the piece by noting, "In 2005 oil was selling for an average of \$38/barrel. In 2007 the average was over \$70/barrel. No amount of wishful thinking will get us back to under \$40/barrel. Those days are gone." I never imagined that oil would, in fact, soar to \$147/barrel. And, even though the price has dropped to \$120/barrel, everyone should have ample reason to think about energy conservation, especially those of us whose hobby depends on the juice.

In that column I noted that, using a Kill-a-Watt meter, I found out where all the power wasters, known as the "phantom load," lived in my house. The worst of the lot were satellite receivers and similar electronics devices. Even when these units are turned off they're



P3 International's Kill-a-Watt showed me how to save over \$300 in power bills last year. (Courtesy: C.Crane)

still sucking down an appreciable, but unappreciated quantity of power. Since then I replaced all the incandescent lamps with compact fluorescents and got into the habit of simply unplugging any electronic device that wasn't actually being used. The result was a dramatic drop in my monthly electric bill.

Over the last 12 months, I used 2,760 fewer kilowatt hours, saving more than \$300 over the previous 12 month period. The highest month for power consumption during that period was August (960 kWh) and the lowest month was April (370 kWh). In the year previous, before paying attention to the electric bill, the highest month was July (1610 kWh) and the lowest month was April (610 kWh).

This was a minimal effort and at no time were we inconvenienced. It wasn't an exercise in frugality but commonsense conservation. I'm convinced that I can do even better and suggest that if one million households in my state did the same thing, at no inconvenience, 2.7 billion kWh would be saved each year. And, each household would get a \$300 discount from the power company. Think of how your radio hobby could benefit from a \$300 cash infusion!



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Spooky "Out of This World" Audio Streams

Space is a neat place, and now thanks to the Internet, and you can eavesdrop on this neighborhood via several audio streams that monitor signals that are simply out of this world.

❖ Natural Radio

Our first place to explore are some near Earth signals courtesy of Mother Nature. Over the years, we have run a number of features in *MT* on monitoring natural radio. To monitor these interesting signals you must have a special receiver that can monitor the Very Low Frequency (VLF) band from 3-30 kHz. These receivers are available from several sources which we have listed in our GlobalNet Resource Guide.

If it were possible to see very low frequency waves (VLF) by eye, we would be dazzled by electromagnetic emissions such as sferics, tweeks, whistlers, chorus, and many others. These are natural radio waves or emissions coming from such common phenomena as lightning. There are also VLF emissions that reach the ground from tens of thousands of miles from the Earth.

VLF radio emissions are at such low frequencies we can't hear them, but they can be received, amplified, and converted into sound that we can hear. Each of the natural VLF radio emissions has a very distinctive sound.

Sferics

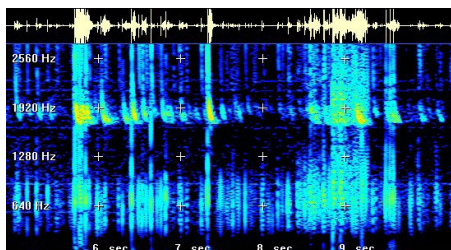
Sferics, short for "atmospherics," are the impulsive signals emitted by lightning. The frequency range is from a few hertz to millions of hertz. The part of this range that we can hear (the audio range) has frequencies up to about 15 thousand hertz (15 kHz). The spectrograms of sferics are characterized by vertical lines on the frequency-time graph indicating the simultaneous arrival of all of the audio frequencies. The sound of sferics consists of sharp crackling noises like twigs snapping or sizzling noises like bacon frying. Sferics are caused by lightning strokes within a couple of thousand kilometers of the receiver. The VLF radio signal is ducted to the receiver between the surface of the earth

and layers in the ionosphere which reflect radio waves. This path is called the earth-ionosphere waveguide.

Tweeks

Tweeks are sferics that travel considerable distances through the ionosphere -- a "dispersive medium" where low frequencies travel slower than high frequencies do. As a result of dispersion, tweeks don't sound like sferics. Instead of the sharp crackling sound, tweeks have a quick musical sound somewhat like the ricochet sound bullets make (at least in the movies). The dynamic spectrum of a tweek shows a vertical line at the higher frequencies with a curved section (called the "hook") appearing at ~2 kilohertz.

Tweeks result when sferics are ducted in

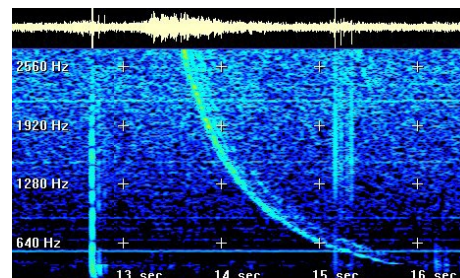


the earth-ionosphere waveguide distances much greater than a couple of thousand kilometers. The distance can be as great as halfway around the earth (20,000 kilometers). When ducted over large distances, the VLF radio waves undergo a process called dispersion -- that is the higher frequencies travel slightly faster than the lower frequencies. This is especially true of the frequencies between 3 and 2 kilohertz.

Whistlers

Whistlers are sferics that are dispersed even more than tweeks. Under the right conditions, the VLF signal travels out away from earth and returns by traveling along a magnetic field line. During this long path, dispersion is much greater than with tweeks. While tweeks might disperse a few hundred kilohertz over a few thousandths of a second, whistlers show a dispersion of a second or more over several thousand kilohertz.

The sound of a whistler is a musical descending tone that lasts for a second or more. On the spectrogram, whistlers appear as long sweeping arcs showing the sequential arrival of the frequencies (the high frequencies arrive first, followed by lower ones). It is important to remember that all of the frequencies start out at the same time (a sferic), but the path taken by a whistler is so long that the dispersion of the frequencies is quite pronounced.



There are several versions of Whistlers that you may hear in the VLF spectrum. These include:

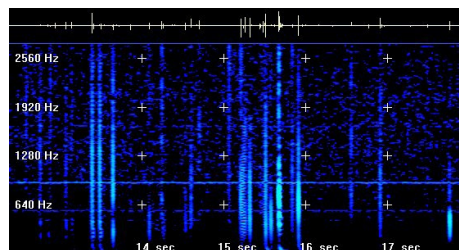
- **Pure Note Whistler:** A pure note whistler has traveled along a single magnetic field line. It is heard as a clear whistling sound and appears on the spectrogram as a strong single curve.
- **Diffuse Whistlers:** Diffuse whistlers have traveled along a set of magnetic field lines that are not all of the same length. The sound is "breathy" or "swooshy".
- **2-hop Whistlers:** Two-hop whistlers originate near the receiver site. The signal that travels along the magnetic field line bounces off the ionosphere in the other magnetic hemisphere and returns to be heard as a whistler near where the original lightning stroke occurred. Two-hop whistlers can be identified by the presence of a strong "local" sferic between one and two seconds before the whistler is heard. Lightning is considered local when it is within about 2000 kilometers of the observing site.
- **Whistler Echo Train:** Echo trains result when the radio wave bounces back and forth between magnetic conjugate points. Each time the signal bounces off the ionosphere, some of the energy leaks down in the lower atmosphere and is heard as a whistler. All of the whistlers in the train are the result of a single lightning stroke.

Chorus

Occasionally, especially in the quiet times of the morning, chorus can be heard. Chorus sounds like many birds calling in turn. Chorus seems to be the result of many brief, short-path whistler-like emissions occurring at almost the same time.

You can hear sferics, tweeks, whistlers, chorus and other VLF radio sounds at any time of the day, but the hours around dawn and dusk are generally best. Nighttime is also better than daytime.

So what does this all have to do with the GlobalNet?! Well, if you don't have the time to listen or you aren't interested in rolling your own receiver or assembling a kit, you can still get in on the fun on the internet.



There are several sites around the world associated with a NASA project that stream natural radio audio streams via the net (see our *GlobalNet* resource guide). The Interactive NASA Space Physics Ionosphere Radio Experiments (INSPIRE) VLF audio stream originates in Huntsville, Alabama (Marshall Space Flight Center), in the Central Time zone of the United States. So if you want to catch the good stuff, convert their dawn and sunset periods in Huntsville to your local time and fire up your WiFi receiver or computer to monitor the sounds of Mother Nature.

There are other sites located in Europe and the United States that also stream Natural Radio and you can find those listings in this month's Resource Guide.

❖ Monitoring Meteors

Another Marshall Space Flight Center audio service streams visitors to Earth from outer space. No, these aren't aliens, but meteors.

The MSFC meteor radar is tuned to 67.25 MHz, which allows the system to record echoes from an array of Channel 4 TV transmitters around the southeastern USA. All of the transmitters are over the horizon as viewed from the Marshall Space Flight Center, so it is normally impossible to detect them. But when a meteor races by, the distant TV signals bounce off the ionized meteor trail and down onto the MSFC antenna.

On a typical day, when there's no intense meteor shower, radar listeners will hear about one ping per minute or so. Rates could become substantially higher during a meteor shower. The best time to listen is always during the hours around dawn (0800 - 1400 UTC) in Huntsville, Alabama, where the radar is located.

❖ Monitoring a Planet

How would you like to listen to a planet? You can, courtesy of the University of Florida Radio Observatory. These folks monitor signals originating from Jupiter. The observations are made at several discrete frequencies in the frequency range of 18-32 MHz, which is the optimum range for observing Jupiter from ground based stations. Observations of Jupiter's radio emission are performed between dusk and dawn when the ionosphere is transparent to these low

radio frequencies and the level of interference is low. Jupiter's radio emissions are bursty and sporadic in nature. They have sample streams as well as a page devoted to predictions of activity.

If you would like to hear what has already been recorded, be sure to visit the *Strange Extraterrestrial Radio Noises* article at the link listed in our resource section.

❖ Spooky Sounds

And, just in time for Halloween, I have a website you can visit that has some spooky sounds archived from space. Now this website doesn't have any live streaming audio, but you can hear some archived audio files from the outer reaches of our solar system. Here you will hear audio from Jupiter, Ganymede, the Cassini spacecraft, Saturn, Enceladus, Titan, Lightning on Saturn, and the Final Frontier.

So, if you are getting tired of regular terrestrial radio services, how about giving some audio streams from outside the ionosphere a try? You might actually enjoy the eerie sounds from out of this world.

GLOBALNET RESOURCE GUIDE

Abelian.org Home Page
www.abelian.org/
 Bielefeld, Germany (DL4YHF)
 Ⓜ Offline www.qsl.net/dl4yhf/
 Cape Coral, Florida
 Ⓜ <http://67.207.143.181/vlf9.m3u>
<http://righttime.com/VLF/dscn5375.jpg>
 Audio Graphs
www.abelian.org/vlf/detail.php?stream=vlf9
 INSPIRE VLF-3 Receiver
<http://image.gsfc.nasa.gov/poetry/inspire/2007/VLF3RadioReceiver.htm>
 Live VLF Natural Radio Portal
www.abelian.org/vlf/
 LF Engineering L-600S H-Field Loop Receiving System
www.lfengineering.com/products.htm
 McGreevy BBB-4 Receiver
www.auroralchorus.com/bbb4rx3.htm
 NASA Inspire Radio - Huntsville, Alabama
 Ⓜ <http://67.207.143.181/vlf0.m3u>
www.spaceweather.com/glossary/inspire.html
 Audio Graphs www.abelian.org/vlf/detail.php?stream=vlf0
 Natural Radio VLF Newsgroup
http://tech.groups.yahoo.com/group/VLF_Group/
 Natural VLF Radio (Stephen P. McGreevy)
www.auroralchorus.com/
 North County Radio ELF Earth Receiver
www.northcountryradio.com/Kitpages/elfrcvr.htm
 Radar Meteors at MSFC
 Ⓜ <http://science.nasa.gov/audio/meteor/forward-scat.m3u>
www.spaceweather.com/glossary/nasameteorradar.html
 Space Weather Sounds (Stephen P. McGreevy)
www.spaceweathersounds.com/
 Sheffield, UK
 Ⓜ <http://67.207.143.181/vlf3.m3u>
<http://markyd26uk.110mb.com/vlf.html>
 Audio Graphs www.abelian.org/vlf/detail.php?stream=vlf3
 Spooky Sounds from NASA
www.jpl.nasa.gov/multimedia/sounds2/sounds-10-29-07Portal.swf

Stereo Bielefeld/Cape Coral
 Ⓜ <http://67.207.143.181/vlf14.m3u>
 Stereo Cape Coral/Inspire
 Ⓜ <http://67.207.143.181/vlf11.m3u>
 Stereo Cape Coral/Sheffield
 Ⓜ <http://67.207.143.181/vlf10.m3u>
 Stereo Inspire/Sheffield
 Ⓜ <http://67.207.143.181/vlf12.m3u>
 Strange Extraterrestrial Radio Noises
www.smeter.net/extraterrestrial/extraterrestrial.php
 Todmorden, UK
 Ⓜ Offline www.abelian.org/vlf/vlfrx.shtml
 University of Florida Radio Observatory
 Ⓜ (Dialup) <http://science.nasa.gov/audio/florida/florida0.m3u>
 Ⓜ (High Speed) <http://science.nasa.gov/audio/florida/florida1.m3u>
<http://ufro1.astro.ufl.edu/liveaccess.htm>
 WR-3 Whistler Receiver
www.auroralchorus.com/wr3.htm
 WR-3GX Natural Radio Receiver
www.auroralchorus.com/wr3gx.htm

GLOBALNET SOFTWARE RESOURCE GUIDE

Butel Client Software - www.butel.nl/easy/eazystream_clientsetup.zip
 Icecast Media Player - www.icecast.org
 Real Audio Player www.real.com
 Spectrum Lab - www.qsl.net/dl4yhf/spectra1.html
 Teamspeak - www.gotamspeak.org
 WinAmp Media Player - www.winamp.com
 Winamp to Spectrum Lab output plugin
<http://freenet-homepage.de/dl4yhf/winamp2speclab/index.html>
 Windows Media Player - www.microsoft.com/wmp

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National Emergency Communications Plan

A common theme running through discussions about public safety radio systems is the ability for one agency to communicate effectively with other agencies during an emergency. As we have seen with numerous natural and man-made crises over many years, the inability of first responders to talk with each other and with higher authorities has made it much more difficult and dangerous for them to do their jobs. To try and address this shortcoming, *interoperability* has become a critical factor in the decision to upgrade and enhance radio networks.

The United States has more than 50,000 independent agencies using emergency communications. Most day-to-day emergencies are handled at the local level by a local incident commander. In order to work effectively with other agencies, these commanders must have worked out mutual aid plans and coordination procedures in advance. Although much of this planning is done at the local level, assistance is becoming available at higher levels.

For instance, all 50 States and six U.S. Territories have developed Statewide Communication Interoperability Plans (SCIPs) that spell out goals for improving interoperability. All of the country's largest urban areas have policies and procedures for interoperating between agencies.

Federal programs that support emergency communications have largely been consolidated within the Department of Homeland Security (DHS). Based on recommendations from the 9/11 Commission, Congress directed DHS to produce a national strategy that would provide guidance for first responders to be able to communicate with each other during emergencies. This summer DHS released the first *National Emergency Communications Plan* (NECP), an 83-page document that sets out goals and initiatives for interoperability planning.



National Emergency Communications Plan

The NECP defines three primary goals:

Goal 1: By 2010, 90 percent of urban areas identified as high-risk for terrorist attacks or natural disasters are able to demonstrate effective emergency communications within one hour for routine events involving more than one public safety agency.

Goal 2: By 2011, 75 percent of non-high risk areas are able to demonstrate effective emergency communications within one hour for

routine events involving more than one public safety agency.

Goal 3: By 2013, 75 percent of all jurisdictions are able to demonstrate effective emergency communications within three hours of a significant event.

Effective emergency communications here means that incident commanders have the capability of managing resources and making timely decisions without technical or procedural impediments related to communications.

High-Risk Urban Areas

State	City
AZ	Phoenix
AZ	Tucson
CA	Anaheim/Santa Ana
CA	Bay Area
CA	Los Angeles/Long Beach
CA	Riverside
CA	Sacramento
CA	San Diego
CO	Denver
CT	Bridgeport
CT	Hartford
DC	National Capital Region
FL	Fort Lauderdale
FL	Jacksonville
FL	Miami
FL	Orlando
FL	Tampa
GA	Atlanta
HI	Honolulu
IL	Chicago
IN	Indianapolis
KY	Louisville
LA	Baton Rouge
LA	New Orleans
MA	Boston
MD	Baltimore
MI	Detroit
MN	Minneapolis-St. Paul
MO	Kansas City
MO	St. Louis
NC	Charlotte
NJ	Jersey City-Newark
NV	Las Vegas
NY	Albany
NY	Buffalo
NY	New York
NY	Rochester
NY	Syracuse
OH	Cincinnati
OH	Cleveland
OH	Columbus
OH	Toledo
OK	Oklahoma City
OR	Portland
PA	Philadelphia
PA	Pittsburgh
PR	San Juan
RI	Providence
TN	Memphis

TN	Nashville
TX	Austin
TX	Dallas/Fort Worth/Arlington
TX	El Paso
TX	Houston
TX	San Antonio
UT	Salt Lake City
VA	Norfolk
VA	Richmond
WA	Seattle
WI	Milwaukee

NECP Objectives

In order to meet these three goals, the NECP establishes seven objectives for improving emergency communications:

1. Someone has to be in charge. There must be formalized decision-making structures and clearly defined leadership roles to coordinate emergency communications.
2. Each agency has to be included in the process. Federal emergency communications programs and initiatives must be collaborative across agencies and aligned to achieve national goals.
3. First responders should employ common planning and operational protocols to effectively use their resources and personnel.
4. Emerging technologies should be integrated with existing emergency communications capabilities by implementing standards, as well as performing research, development, testing and evaluation.
5. Emergency responders need training in realistic exercises, where they can gain technical expertise and improved response skills.
6. All levels of government should encourage advancements in emergency communications through strategic planning, appropriate funding, and partnerships between public and private organizations.
7. Overall, the U.S. needs to have integrated preparedness, mitigation, response, and recovery capabilities to communicate during significant events.

The NECP recognizes that all of this will not happen immediately. The NECP vision – that emergency responders can communicate as needed, on demand, and as authorized at all levels of government and across all disciplines – is expected to become reality in stages.

Because the NECP is a strategic document and not a tactical or operational plan, it identifies a number of initiatives that must be undertaken in order to achieve the overall goals. These initiatives support each of the seven objectives and run the gamut from improved planning processes to equipment compliance testing.

For agencies that might be considering a new radio system, the NECP calls for the development

of a framework to assess emergency communications within one year and the integration of common requirements into Federal grant guidelines within two years. This is important because it will help determine what new projects and systems the Federal government will fund.

Standard Operating Procedures

One initiative that may directly help scanner listeners is the establishment of standard operating procedures. Just like air traffic control, the NECP looks for standardized interaction between emergency responders during an incident, including the use of common terminology, solutions, and backup systems. Some of this work is already underway and includes standard channel naming schemes, establishing nationwide interagency frequencies, and using plain language on the radio rather than code words or agency-specific phrases.

Training

A common problem with new equipment, or even familiar equipment used in unfamiliar ways, is a lack of user training. In order for first responders to effectively use their expensive radios and other equipment, they must be adequately and regularly trained on its proper maintenance and use.

The NECP notes that there are not enough training courses or field exercises for first responders, and recommends an initiative to develop and implement national training and certification programs. These programs would be standardized across the country and be made available on a regular basis.

Future Technology

Because technical innovation is moving toward digital transmissions, the NECP also has an initiative to establish a voluntary standard for voice and data delivery, including real-time situational awareness information and emergency data information exchange. APCO Project 25 (P25) and Voice over IP (VoIP) are specifically mentioned.

The NECP also recognizes that new technologies may provide local incident commanders with new capabilities that improve their ability to perform their duties. To that end, the plan identifies an initiative to research, develop, test and evaluate new voice, video and data solutions for emergency communications that may jump start new services and signals that can be monitored by scanner enthusiasts.

❖ Washington County, Maryland

Washington County, located in the western part of Maryland, is spending \$27 million to upgrade and consolidate their radio communications system. When the upgrades are complete, first responders from different county agencies will be able to communicate directly with each other. The new system will use ten repeater sites, which will be shared with the Maryland State Police. The County and the State have split the \$3.5 million cost for new towers.

Frequencies for the new system are 453.1500,



453.2375, 453.2875, 453.3125, 453.7625, 460.0750, 460.1375, 460.1500, 460.2125 and 460.3875 MHz.

Part of the upgrade includes a new integrated 911 dispatch center. By Thanksgiving a renovated building near Williamsport will be providing combined dispatch services for the Washington County Sheriff's Department, Washington County Emergency Services and the Hagerstown Police Department. The new 911 center will cost just over \$2 million and house a dozen dispatchers as well as training and break rooms.

The new system, which will follow APCO Project 25 standards, is expected to be operational next spring. The nearby counties of Allegany and Garrett are expected to join the system later next year, creating an integrated regional network. This new network will also have the ability to interoperate with the neighboring state of West Virginia, since all of the participating mutual aid agencies will then be using a common technology platform based on P-25 and operating on UHF frequencies. In addition, Washington County has an agreement with the State of Maryland to integrate with the recently announced 700 MHz statewide system.

Until the new system is up and running, public safety and county services will continue to be dispatched on conventional VHF and UHF frequencies.



Frequency	Description
33.08	Fire (Tactical 1)
33.80	Fire (Tactical 3, patch to Frederick County)
33.82	Fire (Tactical 4)
33.84	Fire (Tactical 2)
33.86	Fire (Dispatch)
37.90	County Roads
37.92	County Roads
37.94	County Roads
37.96	County Roads
39.18	Sheriff (Dispatch)
39.60	Sheriff (Channel 2)
151.130	County Roads
153.410	Water Quality
154.280	Fire (Mutual Aid)
155.085	County Detention Center
155.160	Board of Education
155.280	Health Department
453.650	County Commuter Buses
460.150	Sheriff (Clear Spring)
462.975	Emergency Medical Services
463.000	Emergency Medical Services

In a refreshing sign of openness, you can read more about the Washington County Sheriff's Office communications equipment and frequencies at www.washcosheriff.com/pcinfo.html

❖ Jefferson County, West Virginia

Integration does not always come without problems. Some police chiefs in Jefferson County, West Virginia, are expressing concern about a new \$3 million trunked radio system intended to improve county communications. The county is preparing to retire their old analog radio equipment and switch to a new digital network along with a new 911 public safety answering point (PSAP) in

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Bardane, west of Charles Town.

Jefferson County has a population about 42,000 and covers about 200 square miles. It is located across the Potomac River from Washington County, Maryland. Although a largely rural area, it is close enough to the nation's capitol to be considered part of the Washington Metropolitan Area.

Testing of the new county radio system has revealed "dead zones" where radios cannot be heard by dispatchers, including low-lying areas near the Potomac River and inside some buildings. Retuning existing repeater site antennas may solve some of these kinds of coverage problems, although if this is unsuccessful then additional antennas may be needed.

Additional problems include portable radios blocking each other when multiple officers are working together in close proximity and some radios transmitting background noise rather than the officer's voice.

Until the bugs have been worked out and the new system is operational, you can hear county activity on the following conventional frequencies:

Frequency	Description
37.28	Animal Control
42.06	State Police Troop 2 (Dispatch)
42.10	State Police Base, Company C
42.26	State Police Mobile (Statewide)
47.14	Department of Highways
47.28	Department of Highways
47.36	Department of Highways
153.815	County Office of Emergency Services
153.830	County Fireground
153.860	County Fire (Dispatch)
153.890	County Fire (Alternate)
154.280	County Fire (Mutual Aid)
154.540	Jefferson Memorial Hospital
154.875	County Sheriff (Dispatch)
155.235	Emergency Medical Services (Channel 3)
155.340	Emergency Medical Services (Channel 2)
155.385	Emergency Medical Services (Channel 1)
156.030	State Police (Car-to-Car)
158.160	Allegheny Power
158.170	Allegheny Power
158.205	Allegheny Power
158.250	Allegheny Power
158.265	Allegheny Power
158.310	Allegheny Power
158.355	Allegheny Power
158.370	Allegheny Power
460.025	Troop 2 (Link extender for relaying 42.20)
463.200	Public School Buses
465.025	Troop 2 (Link extender for relaying 42.06)

The State operates an APCO Project 25 statewide radio system called West Virginia Interoperability Radio Project (WVIRP). Eight frequencies transmitted from Kearneysville carry WVIRP traffic in Jefferson County: 453.2625, 453.4125, 453.5625, 453.6375, 460.0875, 460.1875, 460.3125 and 460.5875 MHz. The system requires the use of two entries in a Custom Frequency Table:



Base	Spacing	Offset
452.000	12.5	380
460.000	12.5	570

The following is a list of some of the active talkgroups in Jefferson County:

Decimal	Hex	Description
1501	5DD	County Fire (Dispatch, simulcast on 153.860 MHz)
1507	5E3	County Sheriff (Car-to-Car)
1529	5F9	Charles Town Police (Car-to-Car)
1535	5FF	Charles Town Police (Dispatch)
1905	771	State Emergency Operations
1907	773	State Emergency Operations (Region 2)
9181	23DD	State Fire Marshal 1
9183	23DF	State Fire Marshal 2
9185	23E1	State Fire Marshal 3
9771	262B	State Emergency Management (Operations 1)
9773	262D	State Emergency Management (Operations 2)
9775	262F	State Emergency Management (Operations 3)
9777	2631	State Emergency Management (Operations 4)
9779	2633	State Emergency Management (Operations 5)

❖ Marin County, California

Department of Homeland Security is not the only source of funding for new radio systems. Four fire departments in Marin County, California, recently received a combined total of about \$42,000 from the National Park Service. Under the Rural Fire Assistance Program, fire departments from Nicasio, Bolinas, Muir Beach, and Inverness were granted money to fight wildfires. Each of these departments has a mutual aid agreement with the National Park Service and will use the money to purchase digital radios along with protective fire gear and equipment.

The digital radios are APCO Project 25 compliant and will be used to communicate with the National Park Service and Cal Fire during wildfires.

Marin County is across the Golden Gate Bridge to the north of San Francisco. It is home to about 250,000 people and a number of high-tech companies, as well as San Quentin Prison. The county operates a Motorola Type II trunked radio system carrying analog and APCO-25 digital voice traffic. Proper scanning requires a custom frequency table:

Base	Spacing	Offset
482.000	12.5	380
488.000	12.5	570

The Marin County system transmits from five repeater sites on the following frequencies:

East Zone: 482.3500, 482.6250, 482.6500, 482.7875, 482.9375, 483.0250, 483.1250, 488.7000 and 489.0750
 West Zone: 482.9750, 483.0500, 483.1500, 488.4250, 488.8500 and 489.1000
 Sonoma Mountain: 482.3250, 488.4000,

488.4750, 488.7250 and 488.8750
 Bodega Bay: 489.3250, 489.7000, 490.1000 and 490.7250
 Bolinas: 483.0250, 483.9500 and 489.4500

Decimal	Hex	Description
18032	467	County Office of Emergency Services
21616	547	Southern Fire Control
21648	549	Southern Fire Control
21680	54B	Southern Fire (Tactical)
21712	54D	Southern Fire (Command)
21744	54F	Southern Fire (Tactical)
21776	551	Central Fire Control
21808	553	Central Fire Control
21840	555	Central Fire (Tactical)
21872	557	Central Fire (Command)
21904	559	Central Fire (Tactical)
24016	5DD	County Fire (Administration)
24080	5E1	County Fire (Control)
24112	5E3	County Fire (Control)
24144	5E5	County Fire (Tactical)
24176	5E7	County Fire (Command)
24208	5E9	County Fire (Tactical)
32016	7D1	Central Fire (Administration)
32816	803	Southern Fire (Administration)
36016	8CB	Central Fire (Tactical)
36816	8FD	Central Fire (Tactical)
38416	961	Southern Fire (Tactical)
39216	993	Southern Fire (Tactical)
40016	9C5	County Fire (Tactical)
41616	A29	Fire Weather/Information
42416	A5B	County Fire (Tactical)
45616	B23	Sheriff Dispatch 1
45648	B25	Sheriff Dispatch 2
45680	B27	Sheriff (Administration)
45712	B29	County Court
45744	B2B	Sheriff Investigations 1
45776	B2D	Sheriff Investigations 2
45808	B2F	Sheriff Investigations 3
45840	B31	County Jail 1
45872	B33	County Jail 2
45904	B35	Sheriff (Tactical 1)
45936	B37	Sheriff (Tactical 2)
45968	B39	Sheriff (Tactical 3)
46064	B3F	Southern Marin Police (Dispatch)
46096	B41	Southern Marin Police (Dispatch 2)
46128	B43	Southern Marin Police (Tactical 1)
46160	B45	Southern Marin Police (Tactical 2)
46272	B4C	Search and Rescue 1
46304	B4E	Search and Rescue 2
46336	B50	Search and Rescue 3
62928	F5D	Fire Dispatch
62960	F5F	Emergency Operations Center
62992	F61	Fire Call
63056	F65	Fire Talk
63536	F83	Emergency
63552	F84	Central Fire (Dispatch)
63664	F8B	Central Command
63696	F8D	Southern Command
63760	F91	County Fire (Western Command)

There are also at least two digital, non-trunked (conventional) channels for local use by all fire departments in the county, specifically 482.9625 and 485.9625 MHz.

That's all for this month. More information is available on my web site at www.signalharbor.com, including links and scanner comparison charts. Please continue to send your questions, comments and frequency lists to me at dan.veeneman@monitoringtimes.com. Until next time, happy scanning!

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Bearcat® BCT8 Trunk Tracker III

Manufacturer suggested list price \$299.95
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250 Channels • 5 banks • PC Programmable
Size: 7.06" Wide x 6.10" Deep x 2.44" High

Frequency Coverage: 25,000-54,000 MHz., 108,000-174,000 MHz., 400,000-512,000 MHz., 806,000-956,000 MHz., 849,0125-868,9950 MHz., 894,0125-956,000 MHz.

The Bearcat BCT8 scanner, licensed by NASCAR, is a superb preprogrammed 800 MHz trunked highway patrol system scanner. Featuring TrunkTracker III, PC Programming, 250 Channels with unique BearTracker warning system to alert you to activity on highway patrol link frequencies. Preprogrammed service searches makes finding interesting active frequencies even easier and include preprogrammed police, fire and emergency medical, news agency, weather, CB band, air band, railroad, marine band and department of transportation service searches. The BCT8 also has preprogrammed highway patrol alert frequencies by state to help you quickly find frequencies likely to be active when you are driving. The BCT8 includes AC adapter, DC power cable, cigarette lighter adapter plug, telescopic antenna, window mount antenna, owner's manual, one year limited Uniden warranty, frequency guide and free mobile mounting bracket. For maximum scanning enjoyment, also order the following optional accessories: External speaker ESP20 with mounting bracket & 10 feet of cable with plug attached \$19.95. Magnetic Mount mobile antenna ANTMMBNC for \$29.95.



Bearcat® BCD396T Trunk Tracker IV

Suggested list price \$799.95/CEI price \$519.95

APCO 25 9,600 baud compact digital ready handheld TrunkTracker IV scanner featuring Fire Tone Out Paging, Close Call and Dynamically Allocated Channel Memory (up to 6,000 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.40" Wide x 1.22" Deep x 5.35" High

Frequency Coverage:

25,000-512,000 MHz., 764,000-775,9875 MHz., 794,000-823,9875 MHz., 849,0125-868,9765 MHz., 894,0125-956,000 MHz., 1240,000 MHz.-1300,000 MHz.

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as **Fire Tone Out Decoder**. This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning.

Close Call Radio Frequency Capture - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Useful for intelligence agencies for use at events where you don't have advance notice or knowledge of the radio communications systems and assets you need to intercept. The BCD396T scanner is designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS, LTR and EDACS analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. **Dynamically Allocated Channel Memory** - The BCD396T scanner's memory is organized so that it more closely matches how radio systems actually work. Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 3,000 channels are typical but **over 6,000 channels are possible** depending on the scanner features used. You can also easily determine how much memory you have used and how much memory you have left. **Preprogrammed Systems** - The BCD396T is preprogrammed with over 400 channels covering police, fire and ambulance operations in the 25 most populated counties in the United States, plus the most popular digital systems. **3 AA NiMH or Alkaline battery operation and Charger** - 3 AA battery operation - The BCD396T includes 3 premium 2,300 mAh Nickel Metal Hydride AA batteries to give you the most economical power option available. You may also operate the BCD396D using 3 AA alkaline batteries. **Unique Data Skip** - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. **Memory Backup** - If the battery completely discharges or if power is disconnected, the frequencies programmed in the BCD396T scanner are retained in memory. **Manual Channel Access** - Go directly to any channel. **LCD Back Light** - A blue LCD light remains on when the back light key is pressed. **Autolight** - Automatically turns the blue LCD backlight on when your scanner stops on a transmission. **Battery Save** - In manual mode, the BCD396T automatically reduces its power requirements to extend the battery's charge. **Attenuator** - Reduces the signal strength to help prevent signal overload. The BCD396T also works as a conventional scanner to continuously monitor many radio conversations even though the message is switching frequencies. The BCD396T comes with AC adapter, 3 AA nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, SMA/BNC adapter, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. Order on-line at www.usascan.com or call 1-800-USA-SCAN.



Bearcat® BC246T Trunk Tracker III

Suggested list price \$399.95/CEI price \$214.95

Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.72" Wide x 1.26" Deep x 4.6" High

Frequency Coverage:

25,000-54,000 MHz., 108,000-174,000 MHz., 216,000-224,9800 MHz., 400,000-512,000 MHz., 806,000-823,9875 MHz., 849,0125-868,9875 MHz., 894,0125-956,000 MHz., 1240,000 MHz.-1300,000 MHz.

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include **Close Call Radio Frequency Capture** - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. **Dynamically Allocated Channel Memory** - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but **over 2,500 channels are possible** depending on the scanner features used. You can also easily determine how much memory is used. **Preprogrammed Service Search (10)** - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies. **Quick Keys** - allow you to select systems and groups by pressing a single key. **Text Tagging** - Name each system, group, channel, talk group



ID, custom search range, and S.A.M.E. group using 16 characters per name. **Memory Backup** - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. **Unique Data Skip** - Allows the BC246T to skip over unwanted data transmissions and birdies. **Attenuator** - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. **Duplicate Frequency Alert** - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. **22 Bands** - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAh nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part #HF24RS for \$29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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North Atlantic Air Route Communications

Since the time of Columbus, if not longer, travelers have sought to cross the North Atlantic Ocean between Europe and North America. Today, it's the world's busiest oceanic air route, with civil and military flights numbering in the hundreds of thousands yearly. While some position reporting is done by satellite, primary air traffic control is still on the good old shortwave high frequency (HF) band.

In fact, HF radios are still required by international regulations. The mode is upper-sideband (USB) voice, in English. This makes the conversations between aircraft and ground stations relatively easy to receive. It's a bit harder to understand them well enough to actually follow along, but let's try.

❖ The NAT Region

Any time we discuss aviation, the definitions and alphabet-soup acronyms come first. The North Atlantic is a Class II air navigation area, meaning that it is beyond the range of most radar services and terrestrial navigational aids. It's also an Oceanic Control Area (OCA), being outside the coverage of air traffic controllers on standard VHF (very high frequency) radio. What this means is that pilots need to use a whole different set of procedures.

As one means of addressing this and similar situations, international radio conferences have divided most of the planet's surface into 15 Major World Air Route Areas (MWARA). These are much more comprehensible when viewed on maps, although the fuzzy little ones in most radio books aren't much use either. Fortunately, long-time aeronautical listener Risto Hirvonen has created really nice depictions of these areas and how they overlap. It's at www.hfunderground.com/wiki/MWARA.

The region of interest to us is called NAT, an abbreviation for North Atlantic. Just to make things more confusing, NAT also stands for North Atlantic Tracks, which we'll have more on later.

The NAT area is enormous. It's defined in the regulations as the whole region from the North Pole southward, taking in all of Canada, a tiny bit of the US east coast, down to skirt the Caribbean and Central America, and finally across to Africa and up into Europe, before ending back at the pole. Along with all of the ocean and most of Canada, this includes Greenland, Iceland, Portugal, Great Britain, and parts of Spain and Scandinavia.

One succinct, clearly written, and highly comprehensive guide to all this and more is the

official NAT HF Guidance put out by several cooperating international bodies. It includes a guide to station hours, and it even has an appendix that explains HF propagation. It's available online at www.liveatc.net/downloads/NAT-HF-Guidance.pdf.

❖ NAT Stations

This huge region is served by six large HF stations. Most of these have separate transmit and receive sites, full of heavy-duty equipment connected to large farms of high-gain directional antennas. Since this is air traffic control, they work aircraft, not other ground stations. They are:

Shanwick

This station's name comes from "Shannon," the Irish control point for Shannon Aeradio, and "Prestwick," the location of the associated Oceanic Area Control Centre (OACC) in Scotland. Shanwick works closely with historic Gander Radio in Newfoundland, Canada. They maintain the Atlantic Oceanic FIR (Flight Information Region) that specifies the routes of the North Atlantic Tracks every day.

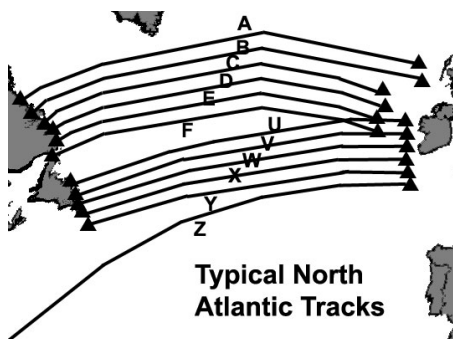
Transmitters are located at 52° 45' North by 8° 56' West. Shanwick operates on NAT Families (subnets) A, B, C, D, and F.

Gander

Gander International Airport, Newfoundland, used to be a traditional refueling stop for planes hopping the "pond." Gander Radio is controlled from the OACC there. Transmitters are located at 48° 58' N by 54° 40' W. Again, operation is on Families A, B, C, D, and F.

Santa Maria

Santa Maria Radio is controlled from the OACC at Vila do Porto in the Azores Islands, which are part of Portugal. Transmitters are at 36° 59' N by 25° 10' W, and operation is on Families A and E.



The International Civil Aviation Organization, a UN Specialized Agency, is the global forum for civil aviation.

New York

New York Radio is a large facility with control at Bohemia, NY, on Long Island. The primary transmit site is in Riverhead, at 40° 52' N by 72° 38' W. The receive site is at South Hampton, and small backup sites exist for both. Families used are also A and E.

Iceland

Iceland (Reykjavik) Radio is operated by Iceland Telecom, Ltd. It transmits from coordinates of 64° 05' N by 21° 50' W. Families used are B, C, and D.

Bodo

Bodo Radio is a smaller station than the rest, though it has recently added two remote sites. Control and the main transmit/receive site are at the Bodo Air Traffic Control Center in Norway, 67° 16' 9" N by 14° 21' E. It provides air traffic control services for the Arctic regions covered by Family D.

❖ Non-NAT Participating Stations

Arctic Radio, a Canadian FIR station located in North Bay, Ontario, provides HF and satellite comm service to the entire Canadian portion of Family D. Canarias, in the Spanish Canary Islands off the west coast of Africa, provides a transition from Family E to that continent's MWARA (AFI). Neither are "official" NAT stations, however.

❖ NAT Families

The six lettered families correspond roughly to latitude ranges, though the coverage areas of stations also enter into it, giving a structure more resembling overlapping ovals. Aircraft are given a primary and secondary frequency to use upon oceanic entry. The primary is higher if the plane is going away from the station, lower if

coming toward it. These frequencies can change in mid-flight, as necessary.

In all cases, frequencies are selected to be the lowest that can provide reliable communication. This helps minimize interference from long-path skip. They tend to get higher in daytime (above 9 megahertz), and lower at night (below 9 MHz).

The VHF frequency of 123.450 MHz is provided in case planes have to talk to each other. "One two three four five" has always been a common pilot chatter frequency, but this is one of its few formal authorizations. Otherwise, the radio is kept on 121.500 MHz, the guard frequency for distress calls.

The HF USB frequencies, in kilohertz (kHz) are:

- A 3016, 5598, 8906, 13306 and 17946;
- B 2899, 5616, 8864, 13291 and 17946;
- C 2872, 5649, 8879, 11336, 13306 and 17946;
- D 2971, 4675, 8891, 11279, 13291 and 17946;
- E 2962, 6628, 8825, 11309, 13354 and 17946;
- F 3476, 6622, 8831, 13291 and 17946.

Note that 13306 kHz is shared between A and C; 13291 between B, D and F; and 17946 between all families. 13354 is a transition frequency shared between NAT-E and two domestic route areas.

NAT-A

Family A is assigned to aircraft with routes passing through Gander, New York, Santa Maria, or Shanwick coverage areas, and especially on latitudes between 43 and 47 degrees north. Family A also becomes primary for aircraft on southerly routes during more inactive periods.

NAT-B and C

Primary ground stations for both families are Gander, Iceland, and Shanwick. Primary latitudes are between 47 and 64 degrees north. Currently, these are used together, though older maps show that B used to be larger.

These families are used to implement the system of North Atlantic Tracks (NAT) used for these busy routes. These are fixed, parallel flight paths at specific altitudes. It's kind of a highway in the sky, designed to allow the most aircraft into the region while maintaining minimum separation of around 10 minutes. The system adapts to the airline scheduling which causes flights to cross in two daily waves resembling tides. This is because eastbound flights tend to leave in the evening, while westbound flights depart early in the day.

Eastbound tracks are given single-letter designators from the end of the alphabet, and westbound from the start. Both directions link into North American and European airspace through designated waypoints on either side of the "pond." These waypoints have 3- or 5-letter designators that are shown on air charts. The route in between is given as a series of fix coordinates or other designated waypoints.

The specific tracks change daily, depending on weather, loading, and flight schedules. The position of the jet stream is a major factor.

They are published by Gander and Shanwick in consultation with the relevant adjacent control areas and the airlines. The resulting Notices to Airmen can be found online.

Typically, pilots work out flight plans with company dispatchers, and contact OACC before oceanic entry for clearance into the requested track and altitude at the estimated time of arrival. These, of course, can change at clearance time if they are unavailable.

Interesting track maps, apparently intended to show passengers where to expect bumpy air, are at www.turbulenceforecast.com/atlantic_eastbound_tracks.php (eastbound), and www.turbulenceforecast.com/atlantic_westbound_tracks.php (westbound)

NAT-D

Family D frequencies are assigned to aircraft primarily above 62 degrees north, in the huge area covered by Bodo, Gander, Iceland, and Shanwick. This includes Greenland, much of the Arctic, and part of the famous "polar route." Arctic Radio covers the remote parts of Canada beyond VHF range, but is not officially a NAT-D station.

NAT-E

Family E frequencies are assigned to aircraft primarily below 43 degrees north, and/or in the coverage areas of New York and Santa Maria. During off-peak periods or in case the number of available families must be reduced, use of this family will be temporarily suspended.

NAT-F

F is a compact route area, using frequencies that are intended to be assigned whenever possible to aircraft flying completely within coverage of Gander and Shanwick. Its hours of use are coordinated between these two stations.

❖ Oceanic Air Comm

Before (hopefully well before) oceanic area entry, pilots will have been assigned their primary and secondary frequencies. Here in Los Angeles, it's quite common to hear aircraft checking in with San Francisco Radio on VHF and HF before they even leave the ground.

The initial callup is basically a radio check. It consists of the aircraft's flight number in voice, and a Selcal check.

Selcal (also spelled Selcall) stands for "selective calling." Scanner listeners who have heard similar two-tone fire paging will recognize just what this is about. Aero Selcal sounds the same; kind of a boop-bip noise.

The aeronautical Selcal is two pairs of tones, as selected from 16 possibilities. Each pair is sent as a single multi-frequency tone lasting about one second, with a 0.2 second pause in between. This gives four different frequencies used in each call. These are given letters as follows (all freqs Hz):

A: 312.6	J: 716.1
B: 346.7	K: 764.3
C: 384.6	L: 881.0
D: 426.6	M: 977.2
E: 473.2	P: 1083.2
F: 524.8	Q: 1202.3
G: 582.1	R: 1333.5
H: 645.7	S: 1479.1

In order to call the airplane, the ground operator punches in the four tones, which are usually written in the formats ABCD or AB-CD. These are sent by the encoder. The decoder in the intended aircraft opens the squelch and alerts the crew that they have a call. This keeps the HF radio silent for most of the flight, creating a more peaceful cockpit.

Aircraft are generally assigned Selcals by Aeronautical Radio, Incorporated (ARINC). These are hard-programmed into the radio, and stay with the plane until it is sold, if not permanently. This creates a problem, since for technical reasons there are far fewer possible codes than airplanes using oceanic HF. This requires use of duplicate Selcals.

Duplicates pose an obvious problem if they show up on the same frequencies simultaneously. Attempts are made to assign these to planes which are for various reasons unlikely to be using the same routes. On rare occasion, they do anyway, and usually one has to change frequency.

Sound card Selcal decoders are available, alone or with multimode packages, often with ability to search user-provided databases. Unfortunately, long propagation paths common to utility DXing often make an accurate ID something of a coin flip. It's still essential to copy the voice callsigns.

The voice communication consists mostly of position reports, data on speed (usually in Mach), fuel, occasional weather observations, and any requests to alter authorized flight plans. In the absence of radar, position checks are what make the system work. We can also hear them being returned over high-frequency data link (HF DL).

Various technologies using satellite navigation and collision alarms are being explored to make navigation more accurate and reduce the wide separation now required. It's still all about piloting skill, though.

Happy landings until next month.

Longwave Resources

✓ **Sounds of Longwave** CD or Audio Cassette (please specify) featuring WWVB, Omega, Whistlers, Beacons, European Broadcasters, and more!
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<http://www.robl.w1.com>

ABBREVIATIONS USED IN THIS COLUMN

AFB.....	Air Force Base
ALE.....	Automatic Link Establishment
AM.....	Amplitude Modulation
ARINC.....	Aeronautical Radio, Inc.
CAMSLANT.....	Communications Area Master Station, Atlantic
CW.....	On-off keyed "Continuous Wave" Morse telegraphy
EAM.....	Emergency Action Message
FAX.....	Radiofacsimile
HFDL.....	High-Frequency Data Link
HF-GCS.....	High-Frequency Global Communication System
M08a.....	Cuban 3-msg CW/MCW, ANDUWRIGMT = 1-0
MARS.....	Military Affiliate Radio System
MCW.....	Modulated CW, alone or as audio tones
NAT-A.....	North Atlantic air route control (also B through F)
Pactor.....	Packet Teleprinting Over Radio, modes I through III
PSK.....	Phase-Shift Keying
PSK220F.....	Amateur fast PSK mode
RDFT.....	Redundant Digital File Transfer; 8-tone PSK
S32.....	Unknown Russian voice 3-number groups
SK01.....	Generic for Cuban numbers in ham digital modes
Unid.....	Unidentified
US.....	United States
USAF.....	US Air Force
USCG.....	US Coast Guard
V02a.....	Cuban "Atencion" Spanish numbers, 3-msg format
VOLMET.....	Formatted aviation weather broadcast

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations have their ENIGMA (European Numbers Information Gathering and Monitoring Association) designators in ().

2182.0	St John's Coast Guard Radio-Canadian Coast Guard, NFD, announced a weather broadcast to follow on 2598, then went there and did it, at 0837. (Tom Severt-KS)
3292.0	Cuban AM female voice numbers (V02a), 5-figure groups in Spanish, at 0239. (Severt-KS)
3756.0	"The Pip"-Probable Russian CW marker, little beeps at 2055. (Ary Boender-Netherlands)
3828.9	"The Squeaky Wheel"-Russian marker, occasional voice traffic (S32) but none heard this time, at 2053. (Boender-Netherlands)
4079.7	TMP-CW hobby temperature beacon, CA, identifier and "49" (Fahrenheit) at 0832. (Severt-KS)
4102.5	"W"-CW wind beacon, identifier and telemetry wind speed dits at 0828. (Severt-KS)
4113.8	FL-CW hobby beacon, FL, at 0839. (Severt-KS)
4325.9	"R"-Russian Navy CW marker, Izhevsk, also on 5465.9, at 2057. (Boender-Netherlands)
4625.0	"The Buzzer"-Russian channel marker for UZB76, buzzing at away at 2054. (Boender-Netherlands)
5135.0	SEMOHQ-New York State Emergency Management, Albany, ALE sounding at 0252. (PPA-Netherlands)
5547.0	San Francisco-Pacific oceanic air control, position from American 102 at 0719. (Severt-KS)
5598.0	Santa Maria-North Atlantic Major World Air Route Area (NAT-A), Azores, working aircraft at 0123. (MDmonitor-MD)
5649.0	Gander-Gander Radio, NFD (NAT-C), working aircraft at 0055. (MDmonitor-MD)
5696.0	CAMSLANT-USCG, VA, taking ops-normal from HC-130J Coast Guard 2003, at 0100. (MDmonitor-MD)
5732.0	LNT-USCG CAMSLANT, raised J39 in ALE, who then passed position in voice as Juliet 39, at 0125 and 0217. (MDmonitor-MD)
5883.0	V02a, AM 5-figure groups at 0725. (Severt-KS)
6712.0	Reykjavik-ARINC, Iceland, HFDL uplinks and squitters, at 0142. (MDmonitor-MD)
6726.0	Cuban digital "numbers" (SK01), probably PSK220F mode, switched to MCW M08a at 0930. (Robert Kolba-NJ)
6855.0	V02a, partial AM callup 34572, at 2102. (Cam Castillo-Panama)
6924.0	RFI-Possible Saudi Arabia net, working JCI in ALE at 0026. (Severt-KS)
6932.0	Cuban CW cut numbers in 5-figure groups (M08a), in progress at 2108. (Severt-KS)
6953.0	Unid-Fishing boat chatter, discussing best place to pick up hookers upon arrival in port, at 1919. (Kolba-NJ)
7527.0	J34-USCG helicopter, calling LNT (CAMSLANT), ALE at 0259. (ALF-Germany)
7887.0	V02a, AM callups 23172 44011 00473, 68621 64221 43031, 56761 36733 14033, 02412 32051 21432, and 56801 60801 22383 all at 2000. (Castillo-Panama)

7942.0	REA4-Russian Air Force headquarters, Moscow, CW pulses and message in 5-figure groups, at 1742. (PPA-Netherlands)
8000.0	TC2Z1-US Army aviation, Middle East, ALE sounding at 2002. AA2-Israeli Air Force, ALE sounding at 2015. (Michel Lacroix-France)
8009.0	M08a, CW in progress at 2313. (Severt-KS)
8067.0	Unid-Cut numbers, likely M08a harmonic from 4034, at 1500. (Jim-GA)
8097.0	M08a, MCW cut-number callups 11683 31673 13561, 46373 72282 22063, 17353 36101 86232, and 41303 16453 77873, all at 1800. M08a, MCW cut-number callups 33811 47071 65572, 11683 31673 13561, 16753 76803 47261, 38622 60203 02883, all at 1900. (Castillo-Panama)
8100.0	M08a, CW cut numbers, should have been on 8097.0, at 1400. (Kolba-NJ)
8104.0	"Chris Parker"-Net control for Bel Ami Weather Center, opened net at 1230, signed at 1240. (Jim-GA)
8190.0	GRECO-Italian Financial Police, Torre Del Greco, working OT-TONELLI (Patrol Vessel <i>Ottone</i>), ALE at 1015. (ALF-Germany)
8422.0	FGF5697-SailMail, Brugge, Belgium, working French vessel <i>Lou</i> in Pactor, at 2130. (ALF-Germany)
8743.0	HSW-Bangkok Meteorological, Thailand, weather in Thai male voice at 1807. (PPA-Netherlands)
8891.0	Gander-NAT-D, working aircraft at 0132. (MDmonitor-MD)
8906.0	New York-New York Radio, Riverhead (NAT-A), working aircraft at 0122. (MDmonitor-MD)
8912.0	Z13-Unknown agency, working VES (USCG Cutter <i>Venturous</i>), ALE at 0000. (ALF-Germany)
8924.0	<i>Ferret</i> -Vessel in Bahamas, calling Southbound II [Old callsign for Herb Hilgenberg's weather net -Hugh], no joy, went back to 12359, at 2030. (Jim-GA)
8930.0	CAMSLANT Chesapeake-USCG, working "2134" (an aircraft), at 1915. (Jim-GA)
8957.0	Shannon-Shannon Aeradio, Ireland, VOLMET at 0115. Santa Cruz-HFDL ground station, Bolivia, uplinks at 0116, also on 13315 at 2150. (MDmonitor-MD) [Yup; frequency is shared. -Hugh]
8971.0	Pelican 713-US Navy P-3C, working Fiddle (FL), at 1925. (MDmonitor-MD)
8977.0	Reykjavik-ARINC, Iceland, HFDL at 2209. (MDmonitor-MD)
8983.0	CAMSLANT Chesapeake-USCG, VA, calling Coast Guard 1720, then relayed through Jacksonville, at 1800. (Jim-GA) CAMSLANT, ops-normal from HC-130J Coast Guard 2006, at 2146. (MDmonitor-MD)
8992.0	Stone Age-US military, patch via Offutt HF-GCS to Lady Luck, at 0104. (MDmonitor-MD)
9115.1	WQDT278-XNet Yachting Association, Pactor markers with CW identification every 3 minutes, at 2155. (PPA-Netherlands)
10087.0	"014"-ARINC, Krasnoyarsk, Russia, HFDL uplink at 1838. (PPA-Netherlands)
11002.7	"CO"-CW hobby beacon, CO, weak identifier at 2359. (Jim-GA)
11175.0	Teal 11-USAF Reserve WC-130J "Hurricane Hunter," working Andrews HF-GCS at 1345. (Jim-GA) King 4864-USAF rescue C-130, calling Andrews at 1505. (Allan Stern-FL) Tazz 52-US Air National Guard tanker, radio checks with Puerto Rico, at 1632. (MDmonitor-MD)
11220.0	Andrews-USAF, voice and data with Classical at 2005. (MDmonitor-MD)
11297.0	Rostov VOLMET-Russian aviation weather, in Russian, at 1257. (Lacroix-France)
11369.0	CWC 453-Challenge Air Cargo freighter, went to 6577 for New York, at 1407. (Jim-GA)
11387.0	Riverhead-ARINC, NY, HFDL at 1905. (Jim-GA)
11494.0	T16-US Customs, working EST (Customs eastern node), ALE at 2035. (Severt-KS)
12359.0	Unid-Probably "Herb," marine weather net in Canada, position from unheard vessel at 2000. (Jim-GA)
12750.0	NMF-USCG, Boston, MA, FAX weather chart at 1959. (Severt-KS)
13200.0	Andrews-USAF, Andrews AFB, MD, EAM at 1703. (Severt-KS)
13510.0	CFH-Canadian Forces, Halifax, NS, FAX weather chart at 1418. (PPA-Netherlands)
13925.5	WUK437-US Army Corps of Engineers, CA, ALE sounding at 1948. (Severt-KS)
13927.0	Bone 12-USAF B-1B, morale patches through MARS AFA6AY, CA, at 2225. (Stern-FL)
13993.0	AFA1FF-Control of USAF MARS Transcon Net, taking check-ins at 1405. (Stern-FL)
15025.0	LH8983-Lufthansa flight with HFDL position for ARINC Reykjavik, Iceland, at 1232. (Lacroix-France)
17435.0	V02a at 1700, switching to MCW M08a at 1705. (Kolba-NJ)
17436.0	SK01, RDFT with file 33641294.txt, at 1700. (Severt-KS)
17515.0	V02a, AM callup 89361 88870 14001, at 1600. (Severt-KS)

Listening to Your Letters

This month we deal with a couple of recent letters from readers.

❖ A Tale of Two Link-11s

Jim from Tennessee writes "Please, can you help? I'm at a loss to explain a data signal on 4653kHz USB and LSB. It's the same signal whether I listen on LSB or USB on the same frequency! What's going on?"

Firstly, a quick tune of the dial reveals the characteristic "rink-rink-dink raaasp" sound of a NATO Link-11 (aka TADIL-A aka Alligator) signal. See *Digital Digest* in the May 2007 issue of *MT* for a full run-down of this interesting and common signal which is heard widely throughout the HF spectrum. You can see a photo of some typical "black box" modems that generate the Link-11 signal



below.

Now to the rest of the mystery. As Jim correctly noted, pressing the USB button on the radio and then the LSB button reveals that both sidebands are carrying Link-11. However, using two radios on-frequency with each tuned to the different sideband tells us that the LSB and USB signals are actually sending different information. What's going on here?

During the 1940s and 1950s, much of the HF world moved from AM to SSB as the primary method of transmission. This was for two main reasons: AM requires a constant carrier signal and thus uses full power all the time; secondly, it transmits both sidebands at the same time and therefore occupies twice as much bandwidth to convey the same information. SSB simply suppresses the carrier and selects one of the two usually mirror image sidebands: upper or lower.

Now, imagine if you have two SSB transmitters tuned to the same frequency and feed one signal into the one on the lower sideband and a different one on the upper sideband, combine them and suppress the carrier signal. Bingo! You've just made an ISB (Independent Side Band) transmitter. You can park your receiver on the carrier frequency and select the lower sideband to hear one signal and the upper sideband to hear the other.

This is what Jim was hearing and is quite common with Link-11 transmitters. It is also frequently heard on shortwave programming feeds (often with the US Forces Network), where two completely different programs can be heard on the same frequency: one on USB, the other on LSB.

Next time you hear a Link-11, check the other sideband and see what you find there.

❖ Decoding the Mexican Navy

Another letter, this time from Bill, asks how to set up MultiPSK or PC-ALE to decode the Mexican Navy ALE signals.

Unfortunately, we're unlikely to ever be able to decode these signals unless someone deciphers the signal used by the Israeli Tadiran company, whose HF2000 and HF6000-series radio equipment is extensively deployed by the Mexican Navy.

The distinctive 125bd 4 tone FSK ALE signal, also called an Autocall, is very commonly heard across the US. If you pop a spectrum analyzer on an autocall, you'll see that the signal starts with a unmodulated +1000Hz tone. In fact, and somewhat ironically, I've often heard the Mexican Navy operators chat in Morse Code using the 1000Hz tone, after they've made contact with the autocall and 110A high speed modem!

The four tones of the Tadiran autocall signal are almost 3kHz above the carrier (USB) frequency, and are at +2400, +2700, +3000 and +3300Hz. After a brief period of reversals on the lowest two tones, the ALE data is sent using the full four-tone signal. The same four-tone signal is also used to send slow speed data at 125bd, easily distinguished from an autocall since it lasts much longer, the autocall usually being over in a few seconds.

Like most ALE signals, the Tadiran Autocall is usually placed on a whole or sometimes half kilohertz point.

But all is not lost. Much of the follow-on traffic from the Mexicans uses the MIL-188-110A high-speed modem which can be successfully decoded by a number of available software packages.

At the top end of the price range are the Wavecom series of decoders and the Hoka Code30 and Code300-32 packages. In the middle is SkySweeper, and at the low end (in other words, free) is RFSM2400. Check the October 2007 issue of this column to read full details of how to decode 110A serial tone modem signals using these packages.

Here are a few frequencies where the Tadiran autocall has been heard recently:

4465, 4525, 5450, 4603, 5255, 5322.5, 5400, 5423, 5545, 5577.5, 5577, 5656, 6898, 6985, 7904, 8145, 16020, 16135, 18305, 18371, 19100 kHz USB.

That's it for this month. Please keep the letters and emails coming.

RESOURCES

Link-11 Audio

signals.taunus.de/WAV/LINK11-1364.WAV

Tadiran Autocall Audio

signals.taunus.de/WAV/TADIRAN-AUTOCALL.WAV

DIGITAL BANDSCAN: (12000 to 12300 kHz)

A variety of digital signals for you to try for. Center of data unless marked with U for USB.

12015.0	???	French Navy	50bd/850 RTTY
12023.5	???	US Navy	Link-11
12022.0U	SKYWAT	US Army	MIL-188-141A ALE
12056.0	???	Russian Diplo	CROWD-36
12057.5	XSS	UK DHFCS	MIL-188-141A ALE
12069.0	CLS	US DLA	MIL-188-141A ALE
12070.0U	RDTEF	Brazilian SIVAM	MIL-188-141A ALE
12103.0U	CAS	Chilean Navy	MIL-188-141A ALE
12051.51	MKD	Royal Navy	2ch Piccolo-6
12115.0	WKS	MarineNet, FL	PacTOR
12122.0U	LRB	US Army CoE	MIL-188-141A ALE
12124.0U	RIC	US CAP	MIL-188-141A ALE
12127.5	NNOMDE	US Navy MARS	PacTOR-II
12129.0U	TECHNIQUE	R&S, Germany	MIL-188-141A ALE
12132.0U	BR3	Brazilian Forces	MIL-188-141A ALE
12136.7	RFPTC	French Forces	200bd/400 ARQ-E3
12137.5	???	Russian Forces	MSS 12 tone modem
12144.0U	HSP	UK MOD	MIL-188-141A ALE
12160.0U	C2ALE2	Moroccan Mil	MIL-188-141A ALE
12165.0	WRD719	SailMail, CA	PacTOR
12185.0U	12D	Canadian Mil	MIL-188-141A ALE
12185.0U	CGE	Venezuelan Mil	MIL-188-141A ALE
12186.0U	OWP	Danish Air Force	MIL-188-141A ALE
12190.1	WQDT278	XNet Yacht Email	PacTOR-III
12190.2	RFVI	French Forces	100bd/400 ARQ-E3
12191.0U	SCLC512	Venezuelan Army	MIL-188-141A ALE
12193.0U	???	???	600bd/L STANAG4285 modem

The Complex 'Erithiopia' Shortwave Scene

More and more shortwave transmitters are turning on in Eritrea and Ethiopia, unfriendly neighbors engaged in a radio war. Thorsten Hallmann in Germany, proprietor of Africalist www.muenster.org/uwz/ms-alt/africalist/ sends us periodic monitoring reports trying to unravel what's going on. We're glad someone is attempting to make sense of it. And this does not include numerous clandestines from abroad. Here is his latest as of press time, many of which are also audible at more convenient times in North America:

From my extensive 'Erithiopia' monitoring August 12, 1630-1830 UT. First the ones being "normal":

R. Ethiopia Home Service: 5990, 7110, 9704, but not 7115.

R. Ethiopia External Service: 7165, 9560, both until 1830 with unID program after French until 1800.

R. Fana: 6110, 7210, heard no more on 7215.

V. of Tigray Revolution: 5950, 6170 (the latter weak, generally irregular).

AUSTRIA [and non] R. Austria's mailbag, mid-August had letters from listeners sad that English broadcasts would cease by yearend. No date given but could even be end of October with seasonal changes (Gilles Létourneau, Quebec, *WORLD OF RADIO*) Meanwhile we have the Sackville relay at 15-16 on 13775, mixing German and English (gh)

BHUTAN On several days of exceptional Asian reception in early August, BBS was heard on 6035 as early as 1244 in presumed Dzongka, Buddhist chanting? Firedrake QRM 1300-1400, then clear in English until 1501* with news, announcements, IDs, interviews, call-in program, pop songs. Further east, try from 1200 (Ron Howard, CA, *DX LISTENING DIGEST*)

BRAZIL On 3140 at 0325 heard Rádio Cidade (?), "a estação do clima", programa show da madrugada. What station is this? (Jorge Freitas, Bahia, Brasil, *radioescutas* yg) Second harmonic of one of the graveyards on 1570, in WRTH 2008: ZYL344, Corinto, MG, 250 watts at night. Nice catch! My advice is not to contact the station, as then they might fix it, frustrating other DXers (Glenn Hauser, *ibid.*) There's a second R. Cidade on 1570, also in Minas Gerais, at Aparecida do Taboado (Ivan Dias, SP, *ibid.*)

Then heard another harmonic, on 3120, at 0106, Rádio Difusora Vale Curu, Pentecoste, Ceará, ID and opening Amado Batista musical program (Jorge Freitas, *ibid.*) 2 x 1560, ZYH622 (Adalberto Marques de Azevedo, *ibid.*)

R. Cultura, Araraquara, SP, reactivated on 3365 in early August, heard at 2228 with local programming, excellent quality (Rudolf Grimm, SP, *radioescutas* yg) Catholic soliciting food, clothes for street people (Marcelo Bedene, PR, *ibid.*) Weaker here in Bahia, citing passage about Peter asking Jesus to make him walk on water too.

Eldorado ESPN on another spur, 5745 at 2341, strong and completely distorted, ID // webstream (Jorge Freitas, BA, *ibid.*)

R. Guarujá, Florianópolis SC heard at 1300 on 5755, that is 225 kHz below fundamental 5980, bad quality, almost unintelligible (Luiz Chaîne Neto, SP, *ibid.*)

cf. last month: R. Voz Missionária, Florianópolis SC, 5870, I am hearing from around 0200 fade-in past 0600, mainly callers phoning in, also contemporary Christian vocals and preaching (Bryan Clark, NZ, mid-July, *DXLD*) I phoned the station and Luis Carlos, Coordinator, confirmed using 10 kW on 5870 and 9665, 1 kW on 11750 (Marcelo Vilela Bedene, DX Clube do Paraná) Also heard at 1253 in late July (Rubens Ferraz Pedroso, Paraná, *radioescutas* yg) Strange that the always-updated Anatel website [= FCC] does not list 5870 (Lúcio Haeser, Brasília, *ibid.*) 49m band in Brasil starts at 5950; something is irregular (Célio Romais, *Panorama*) 5870 silent Aug 12 after having been occupied experimentally by R. Missionária in Florianópolis. Down for maintenance, or not authorized? (Luiz Chaîne Neto, SP, *ibid.*)

Numerous Brazilian listeners from late July reported R. Nacional da Amazônia had moved up from 6180; some said 6185, others 6190, and back to 6180 at times. This has happened before, reasons unclear – to escape CubaRM on 6180? But always bad news for XEPPM, and we heard it on 6188.12 bothering Serbia [non] on 6190 at 2330. If Brasília stays there, Serbia may have to move again, to 6195? A few months before, we got IRS to move off Mexico's 6185 (gh)

RNA, 6188.95v, at 1040-1100 with IDs (Arnaldo Slaen, Argentina, *DXLD*) At that hour probably evading Venezuela via

R. Oromia (presumed): 6030.

The noise jammer: changed from 7090 to 7110 between 1640 and 1650, off around 1700.

Eritrea 1 (presumed): changed to 7999.4 around the same time, some audio caught when transmitter on 8000 paused, but not on much after 1730.

Eritrea 2 (presumed): 7220 from 1700, not heard on 7175

R. Bana (or not): only a weak carrier observed on 5100

Unidentified: 8000. After not hearing it there for over a week (seemed to be on 7100 or 7175 on some days, but probably off or somewhere else on other days), it was back here until 1659 (cut off) and 1701 to 1732 with blank carrier only from 1715 to 1720. But maybe this one has also a name: Twice (about 1645 and 1720) I heard the following, spoken into the music somewhat before some kind of feature started, definitely by one of the usual speakers there: "I-Esran" (or I-Esram) ... "Salam" ... and a sentence ending again with "Esran."

Cuba on 6180 (gh) After 0400 on 6188.18, IDs "Clásico Nacional". Before 0400, Brasília relay of CRI in Spanish was on 9668.18 (Ron Howard, CA, *ibid.*) Looks like there is a correlation as the two were exactly the same offset from presumably intended frequencies 6185 (ex-6180) and 9665. Same odd transmitter? Off-tuning these deliberately would make absolutely no sense (gh)

R. Globo putting out a spur on 11935, strong and extremely distorted, correlates with opening and closing of 11805. In mid-July it was on 12085 (Jorge Freitas, Bahia, *radioescutas* yg)

CAMEROON Re last month's report of Buea back on 6005: I do believe Cameroon is on 6005; badly distorted audio, afternoons until drowned by BBC at 1700, but one day at 1455 was able to decipher funeral announcements in English with several mentions of Buea (James MacDonell, NW Nigeria, *DXLD*) Please try 3970 also! (Thorsten Hallmann, Germany, *ibid.*) Another former Buea channel, maybe used at night (gh)

CHAD Last month we mentioned that RNT was missing on 4905 in the mornings, on 7120 instead, but from late July, 4905 resumed, also evenings (gh) 4905 with Afropop and French announcements, sign off 2055, the next day past 2100 (Edwin Southwell, England, World DX Club Contact) 0549-0630 talking about Chad at the Olympics (Manuel Méndez, Spain, *DXLD*) 4905 sometimes audible until about 0600 in mid-August; should last later now (gh, OK)

CHINA Just as the Chinese broke their promises to open up the Internet during the Olympics, not mistreat journalists, Firedrake musical jamming continued unabated. Among frequencies we monitored, mostly in our mornings between 1200 and 1500 in July and August: 7280, 7310, 7445, 8000, 8020, 9180, 9605, 9680, 9780, 9845, 10250, 11590, 11605, 11665, 11710, 11775, 11785, 11825, 11840, 11990, 12040, 13570, 13750, 14420, 15255, 15285, 15465, 15795, 17200, 17550, 17560, 17565, 17705 – and that was only by casual scanning, not exhaustive.

The far-out-of-band ones are most likely against Sound of Hope, which keeps jumping to new frequencies, and Firedrake too. All the SOH operations FOOB with tiny Taiwan ham transmitters serve only to tie up some jammers.

We took some time to enjoy the Firedrake performance with excellent reception on 17200, never forgetting that it's like spoiled children, screaming so they can't hear what their parents are trying to say to them (gh, OK)

4940, Voice of Strait (Channel 1), Fuzhou, 4940, in Chinese but with English IDs consistently at 1300 and 1325 on several different dates as "This is the Voice of Strait News Radio" (Ron Howard, CA, *DXLD*)

On 8794 USB, Changjiang Maritime Security Information Center (presumed), 1348-1427*, in Chinese, with repetitive interval signal (easy listening orchestral music) till hourtop, pips, IDs by man & woman over background music, 1405 begins reading some type of lists (assume it's water traffic information for the Changjiang River, a.k.a. Yangtze), short musical bridges between lists, read by different women announcers (Ron Howard, CA, *DXLD*) Would normally be considered a utility station, but when they start playing music . . . (gh)

BBCWS via Singapore, 9740 has interference in Chinese at 1300. Still Sichuan PBS, which added this frequency after the quake? (gh) Yes, sometimes PBS-1 or PBS-2, // other frequencies (Ron Howard, CA, *DXLD*) Also heard in temporary absence of HCJB German at 0630, so 24 hours? (Noel Green, England, *ibid.*)

COLOMBIA Heard on 3020, R. Nevada, at 2255-

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; sesqui = one and a half; B-08=fall/winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

2312, with ID, local commercials, second harmonic of 1510, unauthorized station in Murillo, central Tolima, first reported years ago by the late Björn Malm in Ecuador (Rafael Rodriguez R., Colombia, *condiglist* yg)

Rafael is also QSL manager of LV de tu Conciencia, 6010, Lomalinda, heard at 0000-0045. He confirms they are on the air irregularly, but only with 50% of radiated power due to bad tubes, and problems with electricity supply (Anker Petersen, Denmark, *playdx* yg)

CUBA RHC made some abrupt frequency changes Aug 11. For the 1100-1500 Spanish transmission, 9550 and 11805 were replaced by 15120 and 15360 to South America. Both old ones had interference from Asia; 15360 much weaker here, and heterodyne from off-frequency TWR Swaziland at 1400-1415 only, aside powerhouse RHC 15370 aimed toward us. 15120 had previously been used by Cuba only for China relay in Spanish at 0000-0100. Let's hope 15120 never appears at the same time Nigeria is using it. The live frequency announcement at 1400 on RHC continued to ignore the new ones.

For more than four months, RHC English to us on 6180 had been colliding with VOA Greenville in English to Africa at 0500-0700, which also puts a potent signal in the opposite direction. We pointed out this conflict repeatedly, but nothing was done, in a game of chicken.

Finally August 11, RHC suddenly swapped 6180 in English at 0100-0700 with 6140 in Spanish at 0000-0500. Arnie Coro would not admit that the change was to end the collision with the unmentionable VOA, which Cuba deliberately jams at other times, but in any event, both RHC and VOA are finally on separate clear frequencies, as they should always be. The move of English from 6180 to 6140 also gets rid of the 6060/6180 mixing product on 6300 which interfered with Western Sahara after 0600. Now that mix is on 6220.

RHC's Sunday-only Esperanto service, heard at 1500 on 11760, announced a new frequency for 2330 repeat. We found it on 5965, not the listed 6140 and 9600 on their website. Another omission there is the entire English broadcast at 2030-2130 on 11760, and sometimes 9505. We also repeatedly heard the Portuguese service closing at 2028 on 11750 and 11800 claiming to be on 17750. Someone please tell the announcers what frequencies they are on! In this case correctly shown on website (gh)

DENMARK Transmissions from Ilskov at Karup on 5815 have come to an end due to illness. The absolute last broadcast from here was June 15. I don't know yet if the transmitter will be relocated to another place in Denmark or sold abroad (Stig Hartvig Nielsen, Denmark, *SW Bulletin*) Was World Music Radio, lately relaying pirates (gh)

DOMINICAN REPUBLIC I had lunch with Rudy Espinal in Santo Domingo. He is doing well, managing a cable TV tourism network, publishing a glossy bimonthly tourism newspaper and doing the voice announcements (multilingual music titles) on an FM station in Santo Domingo called Raíces. You can hear it online at

🔊 www.puntacana-travelguide.com/Dominican-Republic-Live-Radio.html

We had a good time recalling the Radio Earth/Radio Clarin days. The old Radio Clarin building is now occupied by a photocopier company. Santo Domingo has grown incredibly since my last visit there 16 years ago. Next visit soon I'll interview him for *Viva Miami* (Jeff White, FL, *WORLD OF RADIO*) Jeff bought the old R. Clarin 50 kW Wilkinson transmitter now functioning as WRMI on 9955 (gh)

ECUADOR HCJB, Quito, great signal on 6050 as early as 1920-1931, with low-key Spanish female Christian talk but only audible with 200 foot longwire on the beach on the ICF-7600GR and ICF-2010. Listed as 1900 sign-on (Gerry Bishop & Terry L. Krueger, Ft Desoto FL, *DXLD*)

EGYPT R. Cairo, 11550.0, to Europe and onward toward North America including English 2115-2245, had been colliding all summer with WEWN, but the latter took 11 days off for maintenance in late July and early August. Even without WEWN, Cairo suffers from usual self-inflicted low modulation levels; and time signal at 2115: 26.5 seconds slow, why bother? With WEWN on, at best Cairo signal level approached equality, and frequency also matching rather than previous heterodyning (gh)

FRANCE At 1545 I received a new low power DRM station from Grasse with the label "AGORA DRM Test" on 25770-25780 kHz. Website: <http://drmcotedazur.canalblog.com> (Patrick Robic, Austria, *DXLD*)

Authorized 1000 watts, but only 200 watts guaranteed. Not to be confused with another DRM in France on same frequencies, from TDF in Rennes, 100 watts, per DRM schedule (gh)

GEORGIA [non] Soon after the Russian invasion of Georgia in August, RFE/RL added a fourth hour of Georgian language in primetime, says a press release with no further details. We deduced it's probably 18-19 UT on 7370 via Thailand, 9370 via Biblis, Germany. See also USA: VOA (gh)

GERMANY R. Maarifa, 9565 at *2000-2100* daily via unID site, long Arabic talks with French IDs on quarter hour, QRM Marti; website all in Arabic www.maarifa.org Seems to relate to North Africans; not actually a religion, Maarifa promotes an "attitude for life" emphasizing self-affirmation, constructiveness and consideration for others (Michael Ford, UK, *DSWCI DX Window*) Scheduled here is a CVC Arabic broadcast via Jülich, 190 degrees to Algeria, so it must be stealth Christianity (gh) Searching on it and translating own website, it's clearly Christian (Ron Howard, CA, *DXLD*)

HUNGARY Magyar Rádió replaced 5965 with 5940 at 01-02, so its complete residual SW sked is:

01-02 5940 306 degrees to NAM
04-05 3975 ND to CEu, Sundays only
10-11 6025 ND to CEu
16-17 6025 ND to CEu
21-22 3975 ND to CEu

However, IBB is still using the same Jászberény site, also with some

changes August 1, all 250 kW at 65 degrees, daily:

03-04 7155
13-14 11725
14-15 15265
17-18 9520
18-1830 9520

Note how none of the times conflict with MR times, so only one transmitter left? WRTH 2008 listed four (gh)

INDONESIA RRI Fak2, Irian Jaya Barat, 4790, presumably Jakarta news relay at 1208. Nothing on other RRI 60m frequencies, not even 4605 Serui which used to stand out (gh) 4604.94, RRI Serui, not noted for several days around 1200. Hope another Indo hasn't bitten the dust (John Wilkins, CO, via BC-DX)

We were enjoying occasional decent reception of VOI's English hour retimed to 1300, on 9526; except one newscast was nothing but activities of various bureaucrats. Slogan is "the sound of dignity"; 1330 Tuesdays *Let's Speak Bahasa Indonesia Through Songs*. Then it vanished until found July 27 on 11784.86v instead, but just a het underneath Hmong Lao Radio via WHRI. That's weekends only, but every day there is also interference from VOA and Firedrake. Nevertheless, on a couple of occasions, VOI came through on top, but always with that het caused by its own off-frequency. If this had been on a clear 25m frequency, reception would have been very good. Nearby open ones are 11765, 11770, 11790, 11795, 11800. But VOI will never move within a band, just jump unpredictably back to 9526 or 15150.

The 1400 hour in Malay is after the VOA/FD collision, so almost clear on weekdays, except for R. Guaiba, Brazil, weak and off-frequency too, a bit below VOI. If VOI are going to stay on 11784.9 instead of 9526, now it's time to lobby for putting English at 1400 instead of 1300, equally hoping that propagation will improve during the same hour (gh)

KOREA NORTH Various VOK external, and KCBS domestic services were measured one day at 2100 UT: 4404.89, 6250.18, 6398.74, 9345, 9650, 9974.97, 11535, 11677.03, 11865, 13760, 15245.39 kHz (Wolfgang Büschel, Germany, *wddxc BC-DX TopNews*)

[non] Shiokaze - Sea Breeze via JSR, Yamata, Japan on new 6015 ex-6020 in late July at *1400, on a Monday in Japanese, a Friday in English. "This program is broadcast by the Japanese private organization COMJAN, that has been investigating missing Japanese. Please see our contact at www.chosa-kai.jp/" And see bottom of www.chosa-kai.jp/USA.html for letter sent by COMJAN to the US Congress dated July 4, 2008 (Ron Howard, CA, *WORLD OF RADIO*)

KURDISTAN V. of Kurdistan (from Iraqi Kurdistan) not heard on 6335 for a week. Another VOK (of Socialist Kurdish Party of Iran) noted *0245-0320 on 3920 and from 0305 on 4840, all jammed (Rumen Pankov, Bulgaria, *BDXC-UK Communication*)

KUWAIT R. Kuwait in Arabic heard on 14125 in 20m hamband around 1900, mixing product? (Wolf Hadel, DARC bandwatch, via BC-DX) Yes, leapfrog mix of 9855 Arabic and 11990 English separated by 2135 kHz, when both are on (air between 1815 and 2100; should also appear on 7720 (Wolfgang Büschel, *ibid.*) Please ask your country's telecomms to complain to Kuwaiti telecomms (Uli, DJ9KR, Billmeyer, DARC Intruder Watch, *DXLD*)

MAURITANIA R. Mauritanie was already sporadic, but not heard at all on 4845 nor on daytime frequency 7245 for at least ten days following the August 6 coup (gh) But still every night on MW 783 (Carlos Gonçalves, Portugal, *DXLD*) And on Badr 4 satellite (Chris Greenway, UK, *ibid.*)

🔊 And webstreaming, linked via www.publicradiofan.com - we heard announcements about the coup in French, but mostly Arabic and vernacular at http://wm-live.abacast.com/radio_mauritania-wm-32?.wma (gh)

MÉXICO Radio UNAM, XEYU, 9599.3, was last heard in May (gh) Engineer-in-charge, Eusebio Mejia took a job with Instituto Mexicano de la Radio, and his successor has not been named. The SW transmitter is down for repairs.

Radio Universidad de SLP, XEXQ, 6045, supposedly remained on air with antenna near ground level, but unheard. In early August it was heard again after several weeks with musical and talk programming. Said they had installed an inverted V antenna and hoped to raise it higher soon (Julian Santiago Diez de Bonilla, DF, *DXLD*) I could barely make it out again on quiet mornings around 1258 and 1327 (gh, OK)

XERTA, 4800, has new studio address, replacing the previous one and the apartado postal, Andrés Cruz tells me: XERTA, Gabriel Guerra, 13, Col. Zona Escolar Oriente, 07239 - México 75, DF, México. Transmitter site is on Pico de los Tres Padres, northern DF next to México State (Julian Santiago Diez de Bonilla, DF, *WORLD OF RADIO*)

MYANMAR For eight days in early August, Myanma Radio was on 5985.78 around 1300-1400, then went back to 5985.00. Theory is that the off-frequency transmitter is at the old capital Yangon, while the on-frequency is at the new capital Nay Pyi Taw.

5770, Myanmar Defense Forces (presumed) via Taunggyi, at 1332 typical format of indigenous music, then a more traditional military marching band (similar to a retreat ceremony?) (Ron Howard, CA, *DXLD*)

NIGERIA See last month: unusual morning reception of VON on 9690 in mid-June did not repeat until July 23, badly distorted English at 1404-1431+, signal route still mysterious; per Aoki list, goes out at 248 degrees from Ikorodu. 9690 also heard one day until abrupt 2206* in Hausa, probably mistake for missing 7255 (gh, OK)

Borno State Government has bought new equipment and facilities for Borno Radio Television (BRTV). General Manager Alhaji Babakura Abba Jato said the station is going to transmit on the shortwave band based on the new license from NBC (*ThisDay* online via *Media Network blog*) That's Maiduguri: used to be on SW, 4900 and 6100 per a 1971 QSL (gh)

Federal Radio Corporation of Nigeria (FRCN) is to be commissioned in Calabar in the next quarter (Patrick Ugeh, *AllAfrica.com* via *Australian DX*)

News) Used to be on SW 6145, but this could well be mediumwave (Craig Seager, ed., *ibid.*)

PALAU World Harvest Radio International with country music, IDs in English at 1242 July 22 on new 9955, KWHR ex-12130? Also 1330-1500* Aug 3 non-stop music, ID with Box 12, South Bend address, seems testing (Luca Botto Fiora, Italy, *playdx* yg) Nothing in FCC schedule for WHR on 9955; however, KHBN Palau has been registered on 9955 at 0800-1700 and 2200-2300 but I think had not been active. Now it appears they are on, carrying WHR programming! KWHR in lava-land is just not close enough to Asia, to be replaced? This is obscured around here by the Cuban Jamming Command against WRMI (gh)

PERÚ 4834, R. Marañón, Jaen seems silent (Bob Wilkner, FL, DSWCI DX Window) However, weak signal on 4835.46 at 2315-0140 with talk and music (Anker Petersen, Denmark, *ibid.*) Presumed this on 4835.5 at 2246 (Carlos Gonçalves, Portugal, DXLD) Weak or missing signal overseas could be accounted for by NVIS antenna; visiting Ecuador last Feb, Zeljko Crncic found it strong there although had not been able to hear it in Europe (Wolfgang Büschel, BC-DX) unID from Huancabamba on 5059.2 at 2200-2300 (Alfredo Cañote, Lima, *condiglist* yg) It's LV de las Huarinjas, reactivated, heard at 0130-0215*, ex-6819v, not heard here since Dec 2006; sign-off says 5060 (Rafael Rodriguez, Colombia, *ibid.*) Also heard at 1320 as LV de las Huarinjas [sic], as licensed (Cañote, *ibid.*)

6936.3, R. Andina at 0251-0304*. Could not catch location in sign-off. There have been two stations with this name on other frequencies, one in Huancabamba active early this century on 6673v; and one in Huancayo which was on 4995v for a long time.

At 1730 I could hear a weak signal from R. Bethel, 5949.6 with gospel music in Spanish, mentioning FM; not heard for several months and assumed they had left SW (Rafael Rodriguez R., Colombia, *condiglist* yg) Hector Goyena and I also heard it well in the Argentine Andes with national anthem and live religious programs at 1100 (Arnaldo Slaen, *ibid.*) New website is www.bethelradio.fm and address Bethel Radio, Unión 225, Miraflores, Arequipa (Alfredo Cañote, *ibid.*) Last reported in that group in Sept, 2006 (gh)

ROMANIA RRI website announced that new 300 kW transmitters at Galbeni started operating August 4. Now the old transmitters at the other site Tiganesti were going off the air to be replaced by new ones in about two months (Andy Sennitt, Media Network blog)

A comprehensive temporary schedule was not published, but previously listed frequencies were monitored extensively by Wolfgang Büschel *et al.* We also heard the new transmitters, sometimes on one, sometimes on two frequencies, with much improved modulation and signal, e.g. during English at 1200 on 15220, 0000 on 11790, 0300 on 6150. A follow-up note on the website said broadcasts from the new Continentals would be irregular (gh)

The transmitter upgrade is quite successful, and it would be nice to support their continued investment in SW (Anne Fanelli, NY, DXLD) Not only replacing transmitters, but antennas (Wolfgang Büschel, *ibid.*)

Paul Gager quoted in posting to A-DX list some remarks made on RRI's German service mailbox, indicating a rather bleak situation at the station, no matter that Radiocom installs new transmitters: What they do is honorary work rather than serious employment. They called the salaries a "shame", and everybody who gets another job leaves without looking back (Kai Ludwig, Germany, *ibid.*)

SINGAPORE As promised for two months, R. Singapore International made its last broadcasts July 31, after a fortnight of retrospectives and farewells (gh) On the last day at 1050, Malay announcers on 6120 seemed happy and jolly as if having a party; but after 1100 in English on 6080, no joy to be heard (Chuck Bolland, FL, DXLD) Heard the last few minutes until 1400, but nothing really special about the closing (Walt Salmaniwi, BC, HCDX)

RSI website www.rsi.sg/english was also immediately deleted (Alokesh Gupta, India, DXLD) What's the big hurry? (gh) Some RSI programs remained available for streaming if you knew where to find them, such as

🔊 mms://202.172.226.198/RadioRSI/RSI_English/RSI_E_Thu2020.asf (Dragan Lekic, Serbia, *ibid.*) Tending to stall like always (gh)

Domestic relays continued as usual until 1600 sign-off on 31 July but did not come back at 2300. MediaCorp pulled the plug on shortwave entirely from the Kranji site (Alan Davies, Indonesia, DXLD)

But it was an auspicious time to QSL RSI, cleaning out their stock (gh) Replied with form letter, cards, several blank QSLs, mouse pad, lanyard for an ID card, a pile of stickers, magnetic puzzle coaster, and a CD case (Rich D'Angelo, PA via BC-DX) Same here, a kilogram of stuff. I don't understand why they printed new QSL cards, but didn't verify for three years (Juan Antonio Arranz, Spain, *playdx* yg) see also USA: VOA

SYRIA I started a new Radio Damascus Listeners Club: http://groups.yahoo.com/group/radio_damascus/ Also a direct link to it via: www.radio-damascus-listeners-club.tk More listeners are invited to join. The first hour of the daily transmission is now only on satellite (no shortwave); second hour 2110-2215 is on satellite as well as shortwave 9330 and irregular 12085. Feature programs include: Sat Welcome to Syria; Mon & Wed Listeners Overseas; Wed Syria: Land of Civilizations (Kris Janssen, Belgium, DXLD)

UKRAINE Ukrainian Radio restarts relaying the UR-1 national channel from Sept 1, on SW 5970, 100 kW non-directional, to cover outlying regions better (Olexandr Yegorov, The Whole World on the Radio Dial, RUI)

U K [and non] Gorge Poppin asked me to put together a list of recommended BBCWS in English frequencies for North American listeners. I would pick these as heard here in CNA during at least some of the spans shown, none intended for us.

03-04 6145-Ascension, 6005-South Africa
03-06 7160-Ascension
04-06 9410-UK, 7120-South Africa
04-0706 6005-Ascension
09-16 9740-Singapore, 6195-Singapore
11-21 17830-Ascension
12-14 11750-Thailand
13-17 21470-Ascension
15-23 15400-Ascension
17-19 13675-UK (gh)
In West Virginia I would add:
00-01 7105-Oman
01-02 7320-Cyprus
06-07 11765-South Africa
08-11 15400 & 17830-both Ascension
11-12 15400-Ascension
15-17 12095-Rampisham
17-21 12095-Cyprus
(Kent D Murphy, *ibid.*)

U S A VOA quietly cancelled all broadcasts in Russian on July 26, making it an internet-only service. So much for a promise at Sen. Leahy's website to restore funding of VOA Russian (Kai Ludwig, DXLD) However, by August 1, the VOA Russian hours had been occupied by RFE/RL Russian (gh) That also replaced Special English to Russia; too bad (Olex Yegorov, Ukraine, RUI)

More about this:

www.bloggernews.net/116959 (Media Network blog)

www.freemediaonline.org/silencing_of_voice_of_america_russian_23072008.htm

www.bloggernews.net/117189

(via Alokesh Gupta, DXLD)

Russia may have invaded Georgia, but America now has nothing to say to Russians! Georgian-language broadcasts were in line to be dumped, too, but had not yet been, so VOA doubled those from 30 to 60 minutes (gh) 1530-1600 11945 12130 15460, 1600-1630 12105 12130 15460 (Dan Ferguson, SC, DXLD) See also GEORGIA [non]! and Kim's comments: www.kimandrewelliott.com/?id=4576

The day after Singapore closed its SW, VOA jumped onto some ex-RSI frequencies before China or Iran could get them; via Philippines from Aug 2 in English: 13-14 on 7235, 15-16 & 22-24 on 6000 (Victor Goonetilleke, Sri Lanka, DSWCI DX Window)

WRNO met its target date of Aug 1 for more or less regular programming, mostly around 0100-0400 on 7505, IDing as tests, and not heard in the daytime on 15590, which had also tested in July. Mostly preaching by new owner Robert Mawire, about The End Times, etc., mixed with a variety of music (gh) Some light and hard rock, interspersed with classical, an interesting mix (Dan Brown, W1DAN, MA, DXLD)

After another month on 5110 and 9330, Brother Stair cancelled time on WBCQ at end of July. Area 51 returned on 5110, two hours a week starting at 2300 Sundays (Allan Weiner, WBCQ, DXLD) Also webcast via

🔊 www.johnlightning.com:8024 (Larry Will, Area 51)

On July 26, WYFR suddenly switched its far-out-of-band frequency 7780 to 7730 (gh) A government (occasional) user of 7778.5 complained of interference, so we had to move, at 0300-0745 and 1100-1400 (Evelyn Marcy, WYFR) 0304-0745 in Russian, English, German, Romanian, Polish; 1100 English, 1200 Spanish (gh)

July 28 noticed Cairo 11550 in the clear at 2035, no WEWN collision. All other frequencies proved missing in next several hours (gh) Off air for about two weeks of maintenance down time, replacing slew boxes, working on grounding, electrical, etc. (Glen Tapley, WEWN) Actually resumed August 9, including collision with Cairo English at 2115, now almost zero-beat. Very strong 5810 at 0600 suffered from continuous whine/squeal bleeding all the way from 5775 to 5825 originating with Cuban cut numbers station centered on 5800 (gh)

WRMI, 9955 added more R. Prague relays in August, replacing R. República, so jamming should diminish; also new times for WORLD OF RADIO, Sat 2000, Sun 2030 (gh)

VANUATU R. Vanuatu has new A-08 registrations for 3945 or 5055 at 0700-2000, 10 kW non-directional, along with 7260 daytime. 3945 & 5055 will be early morning and night frequencies. Which one depends on propagation and sunspot numbers. New 10 kW transmitters are due on air around October or November, but maybe as late as December 2008 (Wolfgang Büschel, BC-DX) Has used 3945 before, not 5055 (gh)

VENEZUELA [non] RNV, 11680 via Cuba, heard on a Monday at 1501 opening in English, so stilted as to be laughable, too literally translated, alternating with its excellent Spanish, but monolinguals are supposed to keep listening? (gh)

WESTERN SAHARA [non] R. Nacional de la RASD, 6300, now clear of spur from CUBA [q.v.], opens somewhat after 0600 with Qur'an, then nice music fusion, wake-up YL in Arabic; a pair with Equatorial Guinea on 6250 in Spanish from 0500 (gh)

ZIMBABWE [non] Gerry Jackson, boss of SW Radio Africa, explains how the station came to be set up, challenges of running it from UK with a small team of journalists. I have the good fortune to know Gerry personally, and this is one of the best articles about SW Radio Africa that I have seen: www.independent.co.uk/news/media/gerry-jackson-the-radio-heroine-defying-mugabes-heavies-872650.html (Andy Sennitt, Media Network blog)

Until the Next, Best of DX and 73 de Glenn!

BROADCAST LOGS

NOTEWORTHY LOGS FROM OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com
http://mt-shortwave.blogspot.com

0032 UTC on 4949.77

ANGOLA: Radio Nacional (tentative). Noted music at tune-in to Afro hiliife tune. Announcers Portuguese comments at 0042. Poor signal level, being off by 23 kHz. Don't recall this from other logs, as usually their transmitter is right on 4950 kHz (Chuck Bolland, Clewiston, FL). Website: www.rna.ao/

0050 UTC on 6134.82

BOLIVIA: Radio Santa Cruz. Bolivian music to Spanish announcements including ID strings 0055-00057. Local flute/ranchero tunes to sign-off. Poor signal with weak interference from Brazil on 6134.96. (Brian Alexander, PA) Additional Bolivians in Spanish: **Radio Santa Cruz** 6134.80, 0945-1010, 1023-1048; **Radio Mosoj Chaski** 3310, 0946-1000 (Bolland).

0111 UTC on 5010

INDIA: All India Radio-Thiruvananthapuram. Programming in vernacular language, sounding like a radio drama with occasional musical interludes. Decent signal at tune-in, with fade-out by 0130. **AIR-Mumbai** 4840, 0112-0131 (vernacular) presumed ID at 0131 (Scott Barbour, Intervale, NH). **AIR-Chennai** (tentative) 4940, 0022-0035 (Hindi) (Bolland). Website: www.allindiaradio.org/

0121 UTC on 4845

MAURITANIA: Radio Mauritanie. Station on late with announcer's Arabic text to 0130. Observed signal reverb, possibly a live broadcast? Arabic music at 0134 amid fair signal with occasional static crashes and heterodyne from presumed Brazilian Radio Meteorologia 4845.2 (Barbour). 4845, 0629-0651 (Arabic) (Ron Howard, Asilomar Beach, CA).

0124 UTC on 6925

PIRATE: WMPR. Usual fare for Micro Power Radio station. Instrumental techno music to canned ID, "this is WMPR," resuming to techno music. Signal peaks to S9 occasionally despite signal fading. More of same format as signal begins to deteriorate by 0155 (Gayle Van Horn, NC). Additional pirates observed: **Radio Red** 6925USB, 2332-0011. Music included pop, funk, soul, likely a joint effort with Sycko Radio. **RPR** 6925USB, 2153-2200*; **Sycko Radio** 6925USB, 0115-0127 (Joe Wood, Greenback, TN). **Radio Maple Leaf** 6925, 0132-0144*; **WTCR-Twentieth Century Radio** 6925USB, *0144-0245*; **Northwest Radio** 6950USB, 2220-2230 (Alexander).

0150 UTC on 4905.10

BRAZIL: Radio Anhanguera. Portuguese religious programming to contemporary Christian music. Mentions of Anhanguera to closing announcements at 0300. Fair signal quality. Brazilians in Portuguese: **Radio Club do Para** 4885, 0405; **RD Macapa** 4915, 0410 (Wood). **Radio Clube Paranaense** 6039.63, 0210-0230 (Alexander). 6039.71, 0950-1005 **Radio Verdes Florestas** (tentative) 4865.05, 1005-1020 (Bolland). **Radio Guarujá** 5980, 1012-1015; **Radio Gazeta** 5955, 1032+ (S)NPO 23332 (Arnaldo Slaen, Buenos Aires, Argentina). **Radio Brasil** 4785, 0945-0950. (Lúcio Otávio Bobrowiec, Brazil/Cumbre DX)

0151 UTC on 4790.2

PERU: Radio Vision. Familiar Spanish format of religious preaching to the congregation to 0200. Poor signal quality with band and CODAR interference (Barbour). Audible Vision 4790, 0551-0616 (Wood). Peruvians in Spanish: **Radio Victoria** 6019.399, 2332-2359 (Bolland). 6019.38, 0319-0339 (Howard). **Radio Tarma** 4774.96, 1009-1020 (Bolland).

0153 UTC on 6190

GERMANY: Deutschlandfunk. Lite music instrumentals to classical selections. Time pips at 0200 into German newscast to station identification. Announcer's intros to more music at 0207. Signal fair and improving (Barbour).

Live streaming, on-demand audio and podcast www.dradio.de

0232 UTC on 11710

ARGENTINA: RAE. Talk regarding architecture to international service ID in passing. DX program at 0237 to station contact info at 0242. Argentine tango music amid poor-fair signal (Barbour). 11710.6, *2358-0005 multilingual ID; 15343.85, 2201-2225 Portuguese at 0003 (Alexander). 15345.24, 1900-1920 (Bolland).

0400 UTC on 11610

ZIMBABWE: Radio Voice of the People via Madagascar relay. Sign-on to African music and opening ID in vernacular and English.

Vernacular text at 0402 to English news on Zimbabwe politics, violence and security. Closing announcement to 0454 and contact info. Signal very good (Alexander). Website: www.vopradio.co.zw/

0403 UTC on 7260

ALGERIA: Radio Algeria via Skelton, UK. Arabic text to lengthy Qu'ran recitations. Moderate signal (SINPO 34333) parallel with weaker signal on 7250 (Jim Evans, Germantown, TN).

0454 UTC on 9745

ECUADOR: HCJB Global Radio. Religious vocal music to male/female announcer in Spanish. Audible 11920 // 12020 at 2215; 12045, 2342 (German) 12020, 2345 (Portuguese) (Stewart MacKenzie, CA) Ecuador's **Radio Chaskis** 4909.32, 0906-0922 (Spanish) (Bolland).

On-demand and podcast www.vopradio.co.zw/

0458 UTC on 4770

NIGERIA: Voice of Nigeria (Kaduna). Vernacular/English. Pop music to drums and identification. Newscast with drum music bridges between headlines. Poor signal quality (SINPO 24222). **Voice of Nigeria** (Ikoradu) 7255, 2245-2303. Hausa service to closing announcements at 2259 and national anthem. Open carrier past 2303 tune-out (Evans).

0916 UTC on 7125

GUINEA: Radio Conakry. French/Vernaculars. African percussion music selections. Long silent intervals between music to eventual announcement at 0935. Station sign-off at 0926 (Bobrowiec).

1000 UTC on 11709.95

NORTH KOREA: Voice of Korea. Interval signal to ID and national anthem. Opening announcements to 1002 into regional style music. English newscast at 1006 during poor-fair signal. Weak parallel 11735.02, 15180.12 (Alexander). **KCBS Kanggye** 3959.74, 1159 (Korean) **KCBS Pyongyang** 3320.02, 1139-1202 // 2850.02 (fair) 3959.72 (fair) // 6398.73 (good) (John Wilkins, Wheat Ridge, CO).

1101 UTC on 3303USB

CHINA: Zhoushan Meteo (tentative). Weak station here with possible Chinese text, disappeared at 1130 (Wilkins). China audible: **Yunnan PBS-2** 6937, 1112-1116 (vernacular). **Voice of Zhonghua CNR-5**, 7620, 1119-1125 (vernacular) (Slaen). **China Radio International** 15160, 0447 (Chinese) (MacKenzie). **Sichuan PBS-2**, 6060 // 7225, 1242-1300 (Yui); **Sichuan PBS-1**, 9740 // 12015. **Sichuan PBS** 6060, 1346-1358 (Chinese) (Howard).

1235 UTC on 5985

MYANMAR: Myanma Radio (tentative). Very poor signal noting reception splatter from 9735. programming included easy-listening music to vernacular language. Needs more monitoring and improved conditions, clearly not // 5985. Audible 5985, 1322-1340 with rock music to 1330 usual Myanma Radio indigenous musical selection. Musical chimes plus one loud chime and pip at 1230. Signal fair. **Myanmar Defense Forces BC** (tentative) 5770, 1307-1327. Via Taunggyi in vernacular language. Weak signal (Howard).

1417 UTC on 6130

LAOS: Lao National Radio. French service during assumed scheduled language lesson. One French musical ballad amid poor and fading signal. One hour earlier their reception was much better (Howard). 6130, 1119-1205. Lao vocals to talk and filler music, followed by seven gongs marking the local time (7 pm in Laos) with possible news at 1200. Fair at best with noisy band conditions (Wilkins).

2234 UTC on 7105

BELARUS: Radio Belarus. Presumed Belarussian service during easy-listening music to announcers' updates. Signal fair // 7360 poor-fair. (Barbour).

Additional loggings excluded for space constraints are posted as **Blog Logs** on the **Shortwave Central Blog** at the above web address.

*Thanks to our contributors – Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times
English broadcast unless otherwise noted.*

PROGRAMMING SPOTLIGHT

WHAT'S ON WHEN AND WHERE?

Fred Waterer

fredwaterer@monitoringtimes.com
www.doghousecharlie.com/radio

Make 'em Laugh

Almost since the beginning of the radio era, programmers have realized that they needed content that was informative *and* entertaining. For the first time, people could listen to world events and have live performances in their homes. It was only natural that comedy would gravitate to the new medium.

Radio is ideal for the conveying of comedy (or drama for that matter). There is a reason they call it *Theatre of the Mind*. With just the spoken word, sound effects and the listeners' imagination, one can be transported to almost any surreal, improbable or hilarious situation. For instance, with just his voice, the late Mel Blanc was able to put you in the back seat of Jack Benny's perpetually broken down Maxwell.

❖ Comedy at CBC

Canada has a great comedy tradition. This country has produced such talents as Wayne and Shuster (more appearances on the Ed Sullivan Show than any other act), Lorne Michaels, Dan Aykroyd, John Candy, Jim Carrey, Eugene Levy, Mike Myers, Leslie Nielsen, Martin Short and so many more.

Why does Canada pump out so many funny people? I have a theory. Canadians are exposed to the best of both the British and American traditions. Most Canadians can receive American radio and television. And Canadian media have always tended to air a lot of British content. Great radio programs like the aforementioned Jack Benny, Fred Allen and others were as likely to be heard in Canada as British fare like **The Goon Show** and later

parts, radio was the proving ground for many comedians. Just before World War Two, a pair of comics from Toronto, Johnny Wayne and Frank Shuster, hooked up and debuted on CFRB. When the war started they enlisted and spent the rest of that conflict touring and entertaining the troops as part of the Army Show.

In 1946 this became the **Wayne and Shuster** show on CBC Radio, establishing a tradition of literate comedy that survives to this day.



They often used classical or Shakespearean settings and characters; on their first Ed Sullivan appearance, for example, they performed a modern murder investigation using Shakespeare's

Julius Caesar in a sketch called *Rinse the Blood off My Toga*, which spawned the popular catch phrase, "Julie, don't go!" (wikipedia) For a clip go to:

www.canadianshakespeares.ca/multimedia/video/rinse_the_blood.cfm

Following in the steps of **Wayne and Shuster**, CBC Radio has turned out a vast array of humorous to downright hysterical comedy. From the sketch comedy of the **Royal Canadian Air Farce** to that of The Frantics on **Frantic Times** in the 1980s; the subtle word play of Arthur Black to the imaginative stories of Stuart McLean, Canadian radio is funny.

In the 1990s, the tradition of down east humor was firmly established with programs like **The Great Eastern**, about the fictitious Broadcasting Corporation of Newfoundland and its parody of local radio everywhere, and **Madly Off in All Directions** which featured Lorne Elliott and perhaps the greatest radio showcase of stand up comedians in Canada.

Today, one can hear many comedy programs on CBC Radio One, some of which may appear on the CBC Northern Quebec Service, or online at www.cbc.ca **The Debaters** airs on Saturdays at 2230 UTC (630pm local), Sundays at 1530 UTC (1130am local) and features two comedians "debating" a particular issue and scoring points based on their use of "fact and funny."

The Vinyl Café, hosted by Stuart McLean continues its run on Saturdays at 10:05am across Canada (Radio Two), Sundays at 12:05pm and Tuesdays at 11:05pm (Radio One). It's also available via BBC7. Stuart spins yarns about the misadventures of "Dave," the

owner of a fictitious record shop, as well as telling stories of Canada and its people.

This summer, CBC has introduced a number of shows, which I certainly hope are retained in the fall. **The Irrelevant Show** is "A weekly romp of original, biting, ridiculous, outrageous and ultimately hilarious sketch comedy from a crack team in Edmonton based on new material from across the country." (CBC website) It's been heard on Thursdays at 7:30pm and Saturdays at 11:00am.

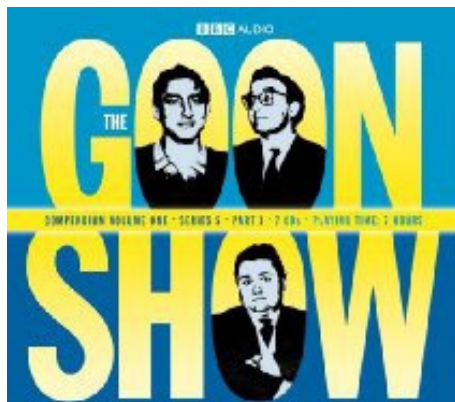
Simply Sean is a return to the literate tradition of Wayne and Shuster. Sean Culen meanders through a hilarious "stream of consciousness" which is bizarre at times, and incredibly funny. Saturdays at 10am. Look for Sean to also host CBC Radio One's New Years Eve program.

❖ The Silly Side of BBC

The British are funny. It's almost like they can't help themselves. Thanks to the BBC, and in many cases the BBC World Service, decades of quality programs have been disseminated throughout the UK and around the world. Perhaps the most famous example of this quirky British humor is Monty Python's Flying Circus, famous on television and in film. But, without radio, one would never have heard of this program. It was built on the experiences of decades of BBC radio.

One of the first great stars of radio comedy in Britain was Tommy Handley. During World War Two, he was the star of **ITMA**, which stood for **It's That Man Again**, a reference to "that man" Adolph Hitler. **ITMA** attracted 16 million listeners per week, and established a format which lasted into the 21st Century. He lampooned the enemy, with a mixture of staccato delivery of lines, some sketch comedy and musical selections. So popular was Handley and **ITMA**, that when he died suddenly in 1949, the BBC rated it national news. His memorial service was held at St. Paul's Cathedral, officiated by the Bishop of London, who said, "he was one whose genius transmuted the copper of our common experience into the gold of exquisite foolery. His raillery was without cynicism, and his satire without malice..." Recordings of this program, for the most part, have been lost. However, one or two episodes remain and are occasionally heard on BBC7.

ITMA begat **The Goon Show**. It ran from



the **Carry On** films and **Monty Python**... usually long before they appeared in the US.

Like their British and American counter-

1951 to 1960 featuring the surreal comedy of Peter Sellers, Spike Milligan and Harry Secombe. "The scripts mixed (bizarre) plots with humour, puns, catchphrases and an array of bizarre sound effects...Famously, Milligan first encountered Secombe after Gunner Milligan's artillery unit accidentally allowed a large howitzer to roll off a cliff – under which Secombe was sitting in a small wireless truck: 'Suddenly there was a terrible noise as some monstrous object fell from the sky quite close to us. There was considerable confusion, and in the middle of it all the flap of the truck was pushed open and a young, helmeted idiot asked 'Anybody see a gun?' It was Milligan..." (wikipedia). Together they created some of the most bizarre, funny, and beloved radio ever made.

Joining them in the 1950s was the brilliant Tony Hancock with **Hancock's Half Hour**. Perhaps most notable about this program was the number of performers who went on to stardom. Hattie Jacques joined the cast. She had started on ITMA. Sid James introduced his dodgy, petty criminal character, which usually duped Hancock in some scheme. And the great Kenneth Williams was introduced, as well as his catch phrase "Stop messin' about." All three went on to great success in radio and film, especially the "Carry On" movies. Williams is well known to shortwave listeners of a certain vintage for his outrageous performances on the BBC/ BBCWS panel show **Just A Minute** in the '70s and '80s.

The 1960s saw a new era of comedy in Britain, in style, not much different than before, but reflecting the times. It was the era of Kenneth Horne who starred in two series, **Beyond Our Ken** and **Round the Horne**. In some ways it was similar to ITMA, opening with a monologue, some sketches and a musical number. Horne often played straight man to Kenneth Williams and his outrageous characters, including one of two ambiguously gay men. It was ground breaking at a time when homosexuality was still a crime in Britain. Listening today, it all seems rather tame, but at the time it was quite cutting edge. The program would have gone on for many years; however, almost 20 years to the day after Tommy Handley's death, Kenneth Horne collapsed and died as he was going on stage.

In the mid sixties a new generation began to be heard on the airwaves. **I'm Sorry I'll Read That Again** debuted in 1964 and aired until 1973. It starred future Python member John Cleese among others, and owed much to the influence of **The Goon Show**. A spin-off of this program, **I'm Sorry I Haven't A Clue** aired until 2008, only ending (apparently) with the death of its long-time host Humphrey Lyttleton.

Other distinctive BBC radio productions have included **The Navy Lark** (sort of a McHale's Navy with a British accent), and in a uniquely British fashion, successful television shows have been redone for radio, often with the original cast. Examples include **Dad's Army**, **To The Manor Born**, **Yes, Minister** and **Yes, Prime Minister**.

The bad news is the dearth of comedy and

humor on the BBC World Service. The good news is that online the BBC hosts a magical place called BBC7. BBC7 is the home of all of the abovementioned programs. **The Goon Show** and **I'm Sorry I'll Read That Again** can be heard on Mondays. One of the **Kenneth Horne** series can be heard on Wednesdays. The other programs rotate in and out of the schedule. To see what's available currently, go to www.bbc.co.uk/bbc7/comedy/

❖ USA Kidders

To do a proper study of US radio comedy history would take far more space than is available in this column. Perhaps in a future column. Here are a few interesting sources of these fascinating classic shows.

Anyone with internet access, and probably broadband as well, should check out www.archive.org and navigate to the "Audio" link at the top, then "Radio Programs." Here you will find literally thousands of old time radio programs for download. A word of warning though: some of these collections are quite large. For instance, one can download almost every Jack Benny radio episode in one file, but that file is over 2GB. So you may be waiting on that particular download for a bit. And of course, it's not just comedy that one can download or listen to. Drama, sports, news – it's all there.

One of the great humorists of all time, Will Rogers, can be heard again via King David Mackenzie's excellent **Echoes of a Century** program. Check it out here at <http://kingdaavid.podbean.com/2008/08/15/echoes-of-a-century-will-rogers/>

WBCQ is the home of a couple of marvelous examples of comedy programming. Six nights per week, one can hear Ed Bolton's recreations of original **Amos and Andy** episodes. They are "meticulous re-creation(s) of the early **Amos and Andy** episodes from the original scripts. Most of these famous radio shows were either not transcribed or no recording survives. The episodes are being presented in chronological order." (WBCQ website) They can be heard Mo-Sa at 0400 UTC on 7415 kHz.

Le Show is hosted by Harry Shearer and can be heard Sunday nights at 2300 UTC, also on 7415 kHz. Shearer in some ways is a 21st Century Will Rogers, looking at the world in his own special way.

❖ Global Grins

Radio Cairo apparently also gets in on the act, with a segment called the **Lighter Side of the News**. I've never heard it, but it sounds intriguing. It may air daily in Radio Cairo broadcasts.

Radio Taiwan International's contribution to this genre is **Instant Noodles**: "It's delicious, and far from nutritious... it's Instant Noodles! In this new version of an old favorite, Andrew looks at the wackiest news coming out of the Asia-Pacific region. Send us a wacky piece of news from your part of the world, and you could win a prize. If your news item is silly (or stupid!) enough to use in our program,

you'll receive a prize in the mail. Submissions can be sent to PO Box 24-38, Taipei, Taiwan ROC. Or send email to: androo@rti.org.tw" It can be heard on Thursday broadcasts at 30 minutes past the hour.

Anyone who listened to **Moscow Mailbag** over the years remembers the late Joe



Adamov's corny joke segment at the end of each program. Often they were so bad they were good. Old Joe may be gone now, but I have noted on

occasion that the jokes do live on sometimes with the current hosts.

A couple of blasts from the shortwave past included **Shortwave Pandemonium** that was hosted in an earlier life, by among others, Kim Andrew Elliott. It was a truly funny show. It was heard via Radio Earth (WRNO) in the early to mid 1980s and had lots of humor around the DXing hobby. HCJB also had a segment called the **Cracker Barrel** although, for the life of me, I can't recall which program it was a part of. I want to say **Musical Mailbag**, but to be honest, I'm just not sure. Any ideas out there?

Via FM, the internet and shortwave radio there you have a quick overview of just some of the comedy gems available. Radio can inform us, entertain us and sometimes just make us smile. That's a good thing.

NASB

National Association of Shortwave Broadcasters

Representing the privately-owned shortwave stations in the USA

- Find links to all of our members at www.shortwave.org
- Subscribe to our free Newsletter: nasbmem@rocketmail.com
- Listen to "The Voice of the NASB" on the third Saturday of each month on HCJB's DX Party Line: 12 midnight Eastern Time on 9955 kHz
- Come to our next annual meeting May 7-8, 2009 in Nashville, TN.
- More info at www.shortwave.org/meeting.htm

NASB is a member of the HFCC (High Frequency Coordination Conference) and the DRM (Digital Radio Mondiale) Consortium

THE QSL REPORT

VERIFICATIONS RECEIVED BY OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com

Prime listening in October

Whether you are a casual program listener, dedicated *trop-head* chasing weak signals in the tropical bands, or a rabid pirate radio fan, October is an excellent month to take advantage of improved shortwave and medium wave conditions. Gone are the high static levels of last summer, and the lure of the DX season has returned.

If chasing the bizarre world of pirate radio is your forté, Halloween is a prime listening opportunity. Look for stations primarily operating on 6925 kHz AM or USB, plus or minus 30-40 kilohertz. For *real-time* logging and station information, refer to the *ACE Logs* link at Free Radio Network www.frn.net. Additional pirate info is available from Ragnar Daneskjold's podcast on www.piratesweek.info/.

October is also prime listening for *Graveyard DX* on medium wave. Post midnight is the best time to monitor weaker stations on 1230, 1240, 1340, 1400, 1450 and 1490 kHz. When first tuning the graveyard frequencies, focus on the strongest signal and use it as a reference point. Be aware of operating schedules from local stations that may block the graveyard frequencies, as a station's *silent-period* may be an excellent opportunity to log and verify dozens of stations. For additional information on Graveyard DXing and the world of medium wave, refer to the National Radio Club Inc. website www.nrcdxas.org/

AMATEUR RADIO

Clipperton Island - TX5C, 20/17 meters SSB. Full data four sided color folder card. Received in 41 days via QSL Manager N7CQQ, P.O. Box 31553, Laughlin, NV 89028. Clipperton Island is described as an uninhabited atoll in Eastern Pacific Ocean (except for the birds, crabs and hams!) (Ken Reitz KS4ZR, VA) Received in 27 days via N7CQQ. (Larry Van Horn N5FPW, NC)



Ducie Island - VP6DX. Full data four sided color folder card. Received in 130 days using the Online QSL Request Form at <http://ducie2008.dl1mgb.com/oqrs/index.php>. (Gil Woodside WA1LAD, West Warwick, RI) This was the second Dxpedition to Ducie Island, and now is a new county in amateur radio - ed.



USA - NBL Mars Station Submarine Base, Groton, CT. Tri-color card commemorating the 59th DoD Armed Forces Day - Military to Amateur Cross Band Communications Test. Received in 77 days for five contacts with station, using the published QSL information and address in Williamsburg, Virginia (Warwick).

CHINA

China Radio International via Havana, Cuba relay. Full data Beijing University of Technology Gymnasium, plus hand written note on the back and a copy of the *Messenger* magazine. Received in one month for an English report.

Station address: English Service, P.O. Box 4216, CRI-2, Beijing 100040 China. (Jim McClanahan W4JBM, Bowden Junction, GA)

Streaming audio <http://english.cri.cn/>
Website www.chinabroadcast.cn/

CLANDESTINE

Taiwan-Furusato No Kaze, 9780 kHz via Tainan. Partial data eQSL in three days for report to info@rachi.go.jp Station address: Policy Planning Division, Headquarters for the Abduction Issue, Cabinet Secretariat, Gov. of Japan, 1-6-1 Nagata-cho, Chiyoda-ku, Tokyo, Japan. (Wendel Craighead, Prairie Village, KS).

MEDIUM WAVE

KHMO 1070 kHz AM. News-Talk-Sports. Verification letter signed by Gary L. Glaenger-Chief Operator, plus day/night coverage maps. Received in 28 days for a CD report and SASE. Station address: 119 North 3rd Street, Hannibal, MO 63401-0711. (Patrick Martin, Oceanside, OR) Website www.khmoam.com/

KNTH 1070 kHz AM. Verification letter signed by Chuck Tiller-Program Director, plus four stickers with coverage map. Letter mentioned they broadcast a limited signal to the northwest to protect KWEL Midland, Texas. Received in 20 days for a CD report and SASE. Station address: 6161 Savoy Drive # 1200, Houston, TX 77036-3363. (Martin)

Streaming audio www.1070knth.townhall.com/

KOOR 1010 kHz AM. Station profile sheet and coverage map with QSL message written at bottom of page, signed by J.C. Koyote-Program Director. Received in nine days for an AM report. Station address: 5110 SE Stark, Portland, OR 97215 (Martin).

PHILIPPINES

Radio Teos-Catholic BCB via Radio Veritas Asia. Partial data card of RVA 15 language services, plus two postcards, schedule and reception report form. Received in 31 days for a CD mp3 report with return mint postage. Station address: P.O. Box 2642, Quezon City 1166, Philippines (Ed Kusalik, Alberta, Canada)

Streaming and on-demand audio www.veritas-asia.org

SÃO TOMÉ

Voice of America relay station. Full data aerial view of São Tomé unsigned, plus VOA calender and program brochure. Received in

20 days for an English report to letters@voa.gov (Harold Woering, Easthampton, MA)

On-demand audio and podcast www.voanews.com

SWEDEN

Radio Sweden 6010/15240 kHz. Full data color photo card of *Norrmalmstorg* trolley with illegible signature, plus program schedule. Received in one week for an English report and \$1.00US. Station address: SE-105 10 Stockholm, Sweden (Gayle Van Horn W4GVH, NC). (McClanahan)

Streaming audio and podcast www.sr.se/rs/english/

UTILITY

Non Directional Beacons

TEL Tell City, TN NDB, 206 kHz. Full data prepared QSL card returned as verified, signed by Bill Bradley-Treasury. Received in 60 days for a SASE. QSL address: Perry County Municipal Airport, 11965 Old State Road 37, Tell City, TN 47586 (Jim Pogue, Memphis, Pogue).

ZDX Coolidge NDB, St. John's, Antigua and Barbuda, 359 kHz. Full data prepared QSL card returned as verified, signed with illegible signature for Chief, Air Traffic Services. Power indicated as 700 watts. QSL address: V.C. Bird International Airport, Atten: Mr. Joshua James-Operations Director, P.O. box 1051, Coolidge, Antigua, Antigua & Barbuda. (Pogue).

STANDARD TIME AND FREQUENCY STATIONS

CHU, 7335/14670 kHz. Email reply from radio.chu@enrc.gc.ca in three days stating QSL card was on the way. Color card of Sanford Fleming painting received via postal mail three days later. Station address: Institute for National Measurement, Standards (INMS) National Research Council of Canada, 1200 Montreal Road, Bldg M-36 Ottawa, Ontario K1A 0R6 Canada. (McClanahan) Website www.eecis.udel.edu/~mills/ntp/chu.html

YVTO, 5000 kHz. No data email confirmation from Alberto Escalona. Received in three days for an English follow-up email to shlv@dhn.mil.ve Email noted a QSL would be forth coming via airmail. Station address: Observatorio Cagigal, YVTO, Apartado 6745, Armanda 84-DHN, Caracas 103, Venezuela. (Joe Wood, Greenback, TN). Website: www.dhn.mil.ve/



HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Saving Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Codes	
s/Sun	Sunday
m/Mon	Monday
t	Tuesday
w	Wednesday
h	Thursday
f	Friday
a/Sat	Saturday
occ:	occasional
DRM:	Digital Radio Mondiale
irreg	Irregular broadcasts
vl	Various languages
USB:	Upper Sideband

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from

her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
ca:	Central America
do:	domestic broadcast
eu:	Europe
me:	Middle East
na:	North America
pa:	Pacific
sa:	South America
va:	various

MT MONITORING TEAM

Gayle Van Horn

Frequency Manager

gaylevanhorn@monitoringtimes.com

Larry Van Horn, MT Asst. Editor

larryvanhorn@monitoringtimes.com

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D' Angelo/NASWA *Flash Sheet*, *NASWA Journal*; Rachel Baughn/MT; Arnie Coro/R Havana Cuba; Alokesh Gupta, New Delhi, India; Ivo Ivanov; Bulgaria; Anker Petersen, Denmark/*DSWCI, DX Window*; Tom banks, Dallas, TX; Daniel Sampson, Ernest Riley/PTSW; Harold Sellers, Canada/*ODXA, DX Listening-In*; Evelyn Marcy/WYFR; Tom Taylor, UK; Wolfgang Büeschel, Germany/*WWDXC BC DX, Top News*; AOKI; *Ardic DX Club; Cumbre DX; DX Asia; British DX Club; EIBI; Hard-Core DX; DX Mix News; World DX Club/Contact*; WRTH.

Shortwave Broadcast Bands

kHz	Meters
2300-2495	120 meters (Note 1)
3200-3400	90 meters (Note 1)
3900-3950	75 meters (Regional band, used for broadcasting in Asia only)
3950-4000	75 meters (Regional band, used for broadcasting in Asia and Europe)
4750-4995	60 meters (Note 1)
5005-5060	60 meters (Note 1)
5730-5900	49 meter NIB (Note 2)
5900-5950	49 meter WARC-92 band (Note 3)
5950-6200	49 meters
6200-6295	49 meter NIB (Note 2)
6890-6990	41 meter NIB (Note 2)
7100-7300	41 meters (Regional band, not allocated for broadcasting in the western hemisphere) (Note 4)
7300-7350	41 meter WARC-92 band (Note 3)
7350-7600	41 meter NIB (Note 2)
9250-9400	31 meter NIB (Note 2)
9400-9500	31 meter WARC-92 band (Note 3)
9500-9900	31 meters
11500-11600	25 meter NIB (Note 2)
11600-11650	25 meter WARC-92 band (Note 3)
11650-12050	25 meters
12050-12100	25 meter WARC-92 band (Note 3)
12100-12600	25 meter NIB (Note 2)
13570-13600	22 meter WARC-92 band (Note 3)
13600-13800	22 meters
13800-13870	22 meter WARC-92 band (Note 3)
15030-15100	19 meter NIB (Note 2)
15100-15600	19 meters
15600-15800	19 meter WARC-92 band (Note 3)
17480-17550	17 meter WARC-92 band (Note 3)
17550-17900	17 meters
18900-19020	15 meter WARC-92 band (Note 3)
21450-21850	13 meters
25670-26100	11 meters

Notes

- Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.
- Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.
- Note 3 WARC-92 bands are allocated officially for use by HF broadcasting stations in 2007.
- Note 4 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide.

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0000 UTC - 8PM EDT / 7PM CDT / 5PM PDT

0000	0000	UK, BBC World Service	5970as	6195as
		7105as	9410as	9740as
		15335as	15360as	17615as
0000	0005	Canada, R Canada International	6100na	
0000	0020	Japan, NHK World/Radio Japan	5920eu	
		6145na	13650as	17810as
0000	0027	Czech Rep, Radio Prague	7345na	9440na
0000	0030	Australia, HCJB Global	15525as	
0000	0030	Serbia, Voice of Serbia	6190va	
0000	0030	Thailand, Radio Thailand	9570af	
0000	0030	USA, Voice of America	7555as	
0000	0045	Egypt, Radio Cairo	9280eu	
0000	0045	India, All India Radio	9705as	9950as
		11620as	11645as	13605as
0000	0045	USA, WYFR/Family Radio Worldwide	17805sa	
0000	0056	Romania, R Romania International	9775na	
0000	0057	Canada, R Canada International	11700as	
0000	0057	Netherlands, R Netherlands Worldwide	9845na	
0000	0100	Anguilla, Worldwide Univ Network	6090am	
0000	0100	Australia, ABC NT Alice Springs	2310do	
		4835do		
0000	0100	Australia, ABC NT Katherine	5025do	
0000	0100	Australia, ABC NT Tennant Creek	4910do	
0000	0100	Australia, Radio Australia	9660as	12080as
		13690as	15240pa	17715as
		17775va	17795va	
0000	0100	Canada, CFVP Calgary AB	6030na	
0000	0100	Canada, CKZN St John's NF	6160na	
0000	0100	Canada, CKZU Vancouver BC	6160na	
0000	0100	China, China Radio International	6020na	
		6075as	6180as	7130eu
		11885as	13750as	15125as
0000	0100	Costa Rica, Worldwide Univ Network	5030va	
		6150va	7375va	9725va
0000	0100	Germany, Deutsche Welle	9885as	15595as
		17525as		
0000	0100	Guyana, Voice of Guyana	3291do	
0000	0100	Malaysia, RTM/Traxx FM	7295as	
0000	0100	New Zealand, Radio NZ International	13730pa	
0000	0100	New Zealand, Radio NZ International	15720pa	
0000	0100	Papua New Guinea, Wantok R. Light	7325va	
0000	0100	Spain, Radio Exterior Espana	6055na	
0000	0100	Ukraine, R Ukraine International	7440na	
0000	0100	USA, Armed Forces Radio Network	4319usb	
		5446usb	5765usb	6350usb
		10320usb	12132usb	13362usb
0000	0100	USA, WBCQ Monticello ME	7415am	9330am
0000	0100	USA, WBOH Newport NC	5920am	
0000	0100	USA, WEWN Vandiver AL	11520me	
0000	0100	USA, WHRA Greenbush ME	5850eu	
0000	0100	USA, WHRI Cypress Creek SC	5875na	
		7385na		
0000	0100	USA, WINB Red Lion PA	9265am	
0000	0100	USA, WRMI Miami FL	9955am	
0000	0100	USA, WTJC Newport NC	9370na	
0000	0100	USA, WWCR Nashville TN	5070na	5935na
		7465na	9980na	
0000	0100	USA, WWRB Manchester TN	3185va	5050na
		5745va	6180va	
0000	0100	USA, WYFR/Family Radio Worldwide	5950na	
		6985na	9505na	11835ca
0000	0100	Zambia CVC Intl/Christian Voice	4965af	15440na
0005	0057	Canada, R Canada International	6100na	
0030	0045	Albania, Radio Tirana	9390na	
0030	0045	Germany, Pan American BC	9640as	
0030	0100	Australia, Radio Australia	15415as	
0030	0100	China, China Radio International	11730as	
0030	0100	Lithuania, Radio Vilnius	11690na	
0030	0100	Thailand, Radio Thailand	12120na	
0030	0100	UK, Bible Voice BC	9490as	
0030	0100	USA, Voice of America	9715va	9780va
		11725va	15185va	15205va
		15560va	17820va	15290va

0100 UTC - 9PM EDT / 8PM CDT / 6PM PDT

0100	0105	Canada, R Canada International	6100na	
0100	0127	China, China Radio International	11730as	
0100	0127	Czech Rep, Radio Prague	6200na	7345na
0100	0127	Slovakia, R Slovakia International	5930na	
		9440sa		
0100	0128	Vietnam, Voice of Vietnam	6175na	
0100	0130	Australia, Radio Australia	17775as	
0100	0130	Serbia, Voice of Serbia	6190va	
0100	0155	Turkey, Voice of Turkey	9620am	

0100	0157	China, China Radio International	6020na	
		6175as	9470eu	9535as
		9580na	9790na	11870as
0100	0157	Netherlands, R Netherlands Worldwide	9845na	
0100	0158	New Zealand, Radio NZ International	13730pa	
0100	0159	Canada, R Canada International	9620as	
0100	0200	Anguilla, Worldwide Univ Network	6090am	
0100	0200	Australia, ABC NT Katherine	5025do	
0100	0200	Australia, ABC NT Tennant Creek	4910do	
0100	0200	Australia, Radio Australia	9660as	12080as
		13690as	15240pa	15415as
		17795va		
0100	0200	Canada, CFVP Calgary AB	6030na	
0100	0200	Canada, CKZN St John's NF	6160na	
0100	0200	Canada, CKZU Vancouver BC	6160na	
0100	0200	Costa Rica, Worldwide Univ Network	5030va	
		6150va	7375va	9725va
0100	0200	Cuba, Radio Havana Cuba	6000na	6140na
0100	0200	Guyana, Voice of Guyana	3291do	
0100	0200	Malaysia, RTM/Traxx FM	7295as	
0100	0200	New Zealand, Radio NZ International	15720pa	
0100	0200	North Korea, Voice of Korea	4405as	7140as
		9345as	9730as	11735am
		15180am		
0100	0200	Papua New Guinea, Wantok R. Light	7325va	
0100	0200	Russia, Voice of Russia	7250na	9665na
		13755na	15425na	
0100	0200	Sri Lanka, SLBC	6005as	9770as
0100	0200	Taiwan, R Taiwan International	11875as	
0100	0200	UK, BBC World Service	7320as	9410as
		9740as	11750as	11955as
		15335as	15360as	17615as
0100	0200	USA, Armed Forces Radio Network	4319usb	
		5446usb	5765usb	6350usb
		10320usb	12133usb	13362usb
0100	0200	USA, KWHR Naalehu HI	17800as	
0100	0200	USA, Voice of America	7430va	9780va
		11705as		
0100	0200	USA, WBCQ Monticello ME	5110am	7415am
0100	0200	USA, WBOH Newport NC	5920am	
0100	0200	USA, WEWN Vandiver AL	11520me	
0100	0200	USA, WHRA Greenbush ME	5850eu	
0100	0200	USA, WHRI Cypress Creek SC	7385na	
0100	0200	USA, WINB Red Lion PA	9265am	
0100	0200	USA, WRMI Miami FL	9955am	
0100	0200	USA, WTJC Newport NC	9370na	
0100	0200	USA, WWCR Nashville TN	5070na	5935na
		7465na	9980na	
0100	0200	USA, WWRB Manchester TN	3185va	5050na
		5745va		
0100	0200	USA, WYFR/Family Radio Worldwide	5950na	
		6985na	9505na	15195as
0100	0200	Uzbekistan, CVC International	11790as	
0100	0200	Zambia, CVC Intl/Christian Voice	4965af	
0130	0200	Iran, Voice of the Islamic Rep of Iran	7235na	
		9495na		
0130	0200	Sweden, Radio Sweden	6010na	
0130	0200	USA, Voice of America	6040va	9820va
0140	0200	Vatican City, Vatican Radio	9650na	
0145	0200	Albania, Radio Tirana	9390na	

0200 UTC - 10PM EDT / 9PM CDT / 7PM PDT

0200	0227	Iran, Voice of the Islamic Rep of Iran	7235na	
		9495na		
0200	0230	South Korea, KBS World Radio	9580sa	
0200	0230	Thailand, Radio Thailand	15275na	
0200	0245	USA, WYFR/Family Radio Worldwide	11835ca	
0200	0257	China, China Radio International	11770as	
		13640as		
0200	0258	New Zealand, Radio NZ International	13730pa	
0200	0259	Lithuania, Mighty KBC Radio	6055na	
0200	0300	Anguilla, Worldwide Univ Network	6090am	
0200	0300	Argentina, RAE	11710am	
0200	0300	Australia, ABC NT Alice Springs	2310do	
		4835do		
0200	0300	Australia, ABC NT Katherine	5025do	
0200	0300	Australia, ABC NT Tennant Creek	4910do	
0200	0300	Australia, Radio Australia	9660as	12080as
		13690as	15240pa	15415as
		17750va	21725va	
0200	0300	Bulgaria, Radio Bulgaria	9700na	11700na
0200	0300	Canada, CFVP Calgary AB	6030na	
0200	0300	Canada, CKZN St John's NF	6160na	
0200	0300	Canada, CKZU Vancouver BC	6160na	
0200	0300	Costa Rica, Worldwide Univ Network	5030va	
		6150va	7375va	9725va
0200	0300	Cuba, Radio Havana Cuba	6000na	6140na

0200	0300	Egypt, Radio Cairo	7270na	
0200	0300	Guyana, Voice of Guyana	3291do	
0200	0300	Indonesia, Voice of Indonesia	9526va	11784al
0200	0300	Malaysia, RTM/Traxx FM	7295as	
0200	0300	New Zealand, Radio NZ International	15720pa	
0200	0300	North Korea, Voice of Korea	3560as	13650as
		15100as		
0200	0300	Papua New Guinea, Wantok R. Light	7325va	
0200	0300	Philippines, Radio Pilipinas	12025va	15285va
		17770va		
0200	0300	Russia, Voice of Russia	9480na	9665na
		9860na	13635na	15425na
0200	0300	Sri Lanka, SLBC	6005as	9770as
0200	0300	Taiwan, R Taiwan International		5950na
		9680na		
0200	0300	UK, BBC World Service	6035af	6195as
		9410va	11955as	15310as
0200	0300	USA, Armed Forces Radio Network		4319usb
		5446usb	5765usb	6350usb
		10320usb	12133usb	13362usb
0200	0300	USA, KJES Vado NM	7555na	
0200	0300	USA, KJES Vado NM	7555na	
0200	0300	USA, KWHR Naalehu HI	17800as	
0200	0300	USA, WBCQ Monticello ME	5110am	7415am
0200	0300	USA, WBOH Newport NC	5920am	
0200	0300	USA, WEWN Vandiver AL	11520me	
0200	0300	USA, WHRA Greenbush ME	5850eu	
0200	0300	USA, WHRI Cypress Creek SC		5875na
		7385na		
0200	0300	USA, WINB Red Lion PA	9265am	
0200	0300	USA, WRMI Miami FL	9955am	
0200	0300	USA, WTJC Newport NC	9370na	
0200	0300	USA, WWCN Nashville TN	3215na	5070na
		5890na	5935na	
0200	0300	USA, WWRB Manchester TN	3185va	5050na
		5745va		
0200	0300	USA, WYFR/Family Radio Worldwide	5950na	
		5985am	6985na	9505na
0200	0300	Uzbekistan, CVC International	11790as	
0200	0300	Zambia, CVC Intl/Christian Voice	4965af	
0215	0230	Nepal, Radio Nepal	5005as	
0230	0257	China, China Radio International		15435me
0230	0258	Vietnam, Voice of Vietnam	6175ca	
0230	0300	Albania, Radio Tirana	7425na	
0230	0300	Netherlands, R Netherlands Worldwide		11550as
0230	0300	South Korea, KBS World Radio		9560na
0230	0300	Sweden, Radio Sweden	6010na	11550va
0245	0300	Myanmar, Myanma Radio	9731do	
0250	0300	Vatican City, Vatican Radio	6040na	7305na
0255	0300	Rwanda, Radio Rwanda	6055do	
0259	0300	DRM	New Zealand, Radio NZ International	11675pa

0300 UTC - 11PM EDT / 10PM CDT / 8PM PDT

0300	0315	vi	Croatia, Croatian Radio	9925na	
0300	0319		Vatican City, Vatican Radio	6040na	7305na
0300	0327		Czech Rep, Radio Prague	7345na	9870na
0300	0327		Vatican City, Vatican Radio	7360af	9660af
0300	0330		Egypt, Radio Cairo	7270na	
0300	0330		Myanmar, Myanma Radio	9731do	
0300	0330		Philippines, Radio Pilipinas	12025va	15285va
			17770va		
0300	0330		Sri Lanka, SLBC	6005as	9770as
0300	0330	Sun	Swaziland, Trans World Radio		3200af
0300	0330	mtwhf	UK, Sudan Radio Service	5975af	
0300	0330		USA, KJES Vado NM	7555na	
0300	0355		South Africa, Channel Africa	3345af	6135af
0300	0355		Turkey, Voice of Turkey	5975am	7265va
			7325na		
0300	0356		Romania, R Romania International		6150na
			9645na	9735as	11895as
0300	0357		China, China Radio International		9690na
			9790na	15110as	11770as
			15120as	15785as	13750as
0300	0400		Anguilla, Worldwide Univ Network		6090am
0300	0400		Australia, ABC NT Alice Springs		2310do
			4835do		
0300	0400		Australia, ABC NT Katherine	5025do	
0300	0400		Australia, ABC NT Tennant Creek		4910do
0300	0400		Australia, Radio Australia	9660as	12080as
			13690as	15240pa	15415as
			17750va	21725va	15515as
0300	0400	twhf	Canada, CBC NQ SW Service	9625na	
0300	0400		Canada, CFVP Calgary AB	6030na	
0300	0400		Canada, CKZN St John's NF	6160na	
0300	0400		Canada, CKZU Vancouver BC		6160na
0300	0400		Costa Rica, Worldwide Univ Network		5030va
			6150va	7375va	9725va

0300	0400		Cuba, Radio Havana Cuba	6000na	6140na
0300	0400		Germany, Deutsche Welle	13770as	15595as
0300	0400		Guyana, Voice of Guyana	3291do	
0300	0400		Malaysia, RTM/Traxx FM	7295as	
0300	0400		Malaysia, RTM/Voice of Malaysia		6175as
			9750as	15295as	
0300	0400		Netherlands, R Netherlands Worldwide		6165na
0300	0400		New Zealand, Radio NZ International		15720pa
0300	0400	DRM	New Zealand, Radio NZ International		11675pa
0300	0400		North Korea, Voice of Korea	4405as	7140as
			9345as	9730as	
0300	0400		Oman, Radio Oman		15355as
0300	0400	vi	Papua New Guinea, Wantok R. Light		7325va
0300	0400		Russia, Voice of Russia	5900na	9800na
			9435na	9480na	9665na
			12065na	15735as	9860na
0300	0400	vi	Rwanda, Radio Rwanda		6055do
0300	0400		Taiwan, R Taiwan International		5950na
			15215sa	15320as	
0300	0400		UK, BBC World Service	3255af	6005af
			6145af	6190af	6195as
			9410va	9750af	12035af
			15310as	17790as	15360as
0300	0400		Ukraine, R Ukraine International		7440na
0300	0400		USA, Armed Forces Radio Network		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
0300	0400		USA, KWHR Naalehu HI		17800as
0300	0400		USA, Voice of America		4930af
			9885af	12085af	6080af
0300	0400		USA, WBCQ Monticello ME		5110am
0300	0400		USA, WBOH Newport NC		5920am
0300	0400		USA, WEWN Vandiver AL		11520me
0300	0400		USA, WHRA Greenbush ME		5850eu
0300	0400	mtwhf	USA, WHRI Cypress Creek SC		6110na
0300	0400	Sat/Sun	USA, WHRI Cypress Creek SC		7385am
0300	0400		USA, WHRI Cypress Creek SC		5875na
0300	0400		USA, WRMI Miami FL		9955am
0300	0400		USA, WTJC Newport NC		9370na
0300	0400		USA, WWCN Nashville TN		3215na
			5890na	5935na	5070na
0300	0400		USA, WWRB Manchester TN		3185va
			5745va		5050na
0300	0400		USA, WYFR/Family Radio Worldwide		5950na
			6085na	9505na	11740sa
0300	0400		Uzbekistan, CVC International		13680as
			15515as		
0300	0400		Zambia, CVC Intl/Christian Voice		4965af
0330	0357		Czech Rep, Radio Prague		6080na
			11600as		9445as
0330	0358		Vietnam, Voice of Vietnam		6175ca
0330	0400	twhf	Albania, Radio Tirana		7425na
0330	0400		UK, BBC World Service		11945af

0400 UTC - 12AM EDT / 11PM CDT / 9PM PDT

0400	0430	mtwhf	France, Radio France International		9805af
			11995af		
0400	0430		Netherlands, R Netherlands Worldwide		9575af
0400	0430		USA, KWHR Naalehu HI		17800as
0400	0430		USA, Voice of America		4930af
			6080af	9575af	11835af
			15580af		12080af
0400	0430		USA, WWRB Manchester TN		3185va
0400	0445		USA, WYFR/Family Radio Worldwide		6985na
			9505na		
0400	0457		China, China Radio International		6020na
			6080as	13750as	15120as
			17730as	17855as	15785as
0400	0457		Netherlands, R Netherlands Worldwide		6165na
0400	0458	DRM	New Zealand, Radio NZ International		15720pa
0400	0458		New Zealand, Radio NZ International		11675pa
0400	0459		South Africa, Channel Africa		3345af
0400	0500		Anguilla, Worldwide Univ Network		6090am
0400	0500		Australia, ABC NT Alice Springs		2310do
			4835do		
0400	0500		Australia, ABC NT Katherine		5025do
0400	0500		Australia, ABC NT Tennant Creek		4910do
0400	0500		Australia, Radio Australia		9660as
			13690as	15240pa	15415as
			21725va		17750va
0400	0500	twhf	Canada, CBC NQ SW Service		9625na
0400	0500		Canada, CKZN St John's NF		6160na
0400	0500		Canada, CKZU Vancouver BC		6160na
0400	0500		Costa Rica, Worldwide Univ Network		5030va
			6150va	7375va	9725va
0400	0500		Cuba, Radio Havana Cuba		6000na
0400	0500		Germany, Deutsche Welle		7225af
					7245af

0400	0500		12045af	15445af	
0400	0500		Guyana, Voice of Guyana	3291do	
0400	0500		Malaysia, RTM/Traxx FM	7295as	
0400	0500		Malaysia, RTM/Voice of Malaysia	6175as	
			9750as	15295as	
0400	0500		Netherlands, R Netherlands Worldwide	12080af	
0400	0500	vl	Papua New Guinea, Wantok R. Light	7325va	
0400	0500		Russia, Voice of Russia	5900na	9800na
			9665na	9860na	13635na
					15735as
0400	0500	vl	Rwanda, Radio Rwanda	6055do	
0400	0500	vl	Uganda, UBC Radio	4976do	5026do
0400	0500	DRM	UK, BBC World Service	5875eu	
0400	0500		UK, BBC World Service	3255af	6005af
			6190af	6195va	7120af
			11945af	12035va	12095as
			15565va	17790as	
0400	0500		USA, Armed Forces Radio Network	4319usb	
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
0400	0500		USA, WBCQ Monticello ME	5110am	
0400	0500		USA, WBOH Newport NC	5920am	
0400	0500		USA, WEWN Vandiver AL	11520me	
0400	0500		USA, WHRA Greenbush ME	5850eu	
0400	0500		USA, WHRI Cypress Creek SC		5875am
			7365am		
0400	0500		USA, WRMI Miami FL	9955am	
0400	0500		USA, WTJC Newport NC	9370na	
0400	0500		USA, WWCR Nashville TN	3215na	5070na
			5890na	5935na	
0400	0500		USA, WWRB Manchester TN	3185va	
0400	0500		USA, WYFR/Family Radio Worldwide	5950na	
			6915na	7730va	9680na
					9715ca
0400	0500		Uzbekistan, CVC International		13680as
			15515as		
0400	0500		Zambia, CVC Intl/Christian Voice		4965af
0430	0500		Australia, Radio Australia	15415as	
0430	0500	mtwhf	Italy, IRRS	5990va	
0430	0500		Nigeria, Radio Nigeria/Kaduna		6090do
0430	0500	mtwhf	Swaziland, Trans World Radio		3200af
			4775af		
0459	0500		New Zealand, Radio NZ International		9615pa
0459	0500	DRM	New Zealand, Radio NZ International		9890pa

0500 UTC - 1AM EDT / 12AM CDT / 10PM PDT

0500	0507	twhf	Canada, CBC NQ SW Service	9625na	
0500	0527		Vatican City, Vatican Radio	9660af	11625af
			13765af		
0500	0529		Vatican City, Vatican Radio	5965eu	7250eu
0500	0530	mtwhf	France, Radio France International		13680af
			15160af		
0500	0530		Germany, Deutsche Welle	9700af	9825me
0500	0530	mtwhf	Italy, IRRS	5990va	
0500	0530		Japan, NHK World/Radio Japan		5975eu
			6110na	11970af	15325as
					17810as
0500	0555		South Africa, Channel Africa	7230af	9735af
0500	0557		China, China Radio International		6020na
			6190na	11880as	15350as
					15465as
			17505me	17730as	17855as
0500	0600		Anguilla, Worldwide Univ Network		6090am
0500	0600		Australia, ABC NT Alice Springs		2310do
			4835do		
0500	0600		Australia, ABC NT Katherine	5025do	
0500	0600		Australia, ABC NT Tennant Creek		4910do
0500	0600		Australia, Radio Australia	9660as	12080as
			13630as	13690pa	15160as
					15240pa
			17750va		
0500	0600		Bhutan, Bhutan Broadcasting Svc		6035as
0500	0600		Canada, CKZN St John's NF	6160na	
0500	0600		Canada, CKZU Vancouver BC		6160na
0500	0600		Costa Rica, Worldwide Univ Network		5030va
			6150va	7375va	9725va
0500	0600		Cuba, Radio Havana Cuba	6000na	6060na
			6140na	9550na	11760am
0500	0600		Guyana, Voice of Guyana	3291do	
0500	0600		Kuwait, Radio Kuwait	15110me	
0500	0600		Malaysia, RTM/Traxx FM	7295as	
0500	0600		Malaysia, RTM/Voice of Malaysia		6175as
			9750as	15295as	
0500	0600		New Zealand, Radio NZ International		9615pa
0500	0600	DRM	New Zealand, Radio NZ International		9890pa
0500	0600		Nigeria, Radio Nigeria/Kaduna		4770do
0500	0600	vl	Papua New Guinea, Wantok R. Light		7325va
0500	0600		Russia, Voice of Russia	17635pa	21790pa
0500	0600		Swaziland, Trans World Radio		3200af
0500	0600		Swaziland, Trans World Radio		4775af
			6120af	9500af	
0500	0600	vl	Uganda, UBC Radio	4976do	5026do

0500	0600		UK, BBC World Service	3255af	6005af
			6190af	6195va	7120af
			9410va	11945af	12095as
			15360as	15420af	15565va
			17790as		17640af
0500	0600	DRM	UK, BBC World Service	6195af	
0500	0600		Ukraine, R Ukraine International		9945eu
0500	0600		USA, Armed Forces Radio Network		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
0500	0600		USA, KWHR Naalehu HI	11565as	13650as
0500	0600		USA, Voice of America	4930af	6080af
			6180af	12080af	15580af
0500	0600		USA, WBCQ Monticello ME	5110am	
0500	0600		USA, WBOH Newport NC	5920am	
0500	0600		USA, WEWN Vandiver AL	11520me	
0500	0600	Sat/Sun	USA, WHRA Greenbush ME	7490va	
0500	0600		USA, WHRI Cypress Creek SC		5875am
			7365am		
0500	0600		USA, WRMI Miami FL	9955am	
0500	0600		USA, WTJC Newport NC	9370na	
0500	0600		USA, WWCR Nashville TN	3215na	5070na
			5890na	5935na	
0500	0600		USA, WWRB Manchester TN	3185va	
0500	0600		USA, WYFR/Family Radio Worldwide	5950na	
			6915na	9355va	9680na
0500	0600		Uzbekistan, CVC International		13680as
			15515as		
0500	0600		Zambia, CVC Intl/Christian Voice		4965af
			9430af		
0515	0530	vl	Rwanda, Radio Rwanda	6055do	
0530	0556		Romania, R Romania International		9655eu
			11830eu	15435pa	17770pa
0530	0600		Australia, Radio Australia	15415as	
0530	0600	vl	Rwanda, Radio Rwanda	6055do	
0530	0600		Thailand, Radio Thailand	17655va	
0530	0600	mtwhf	UK, Sudan Radio Service	9525af	13720af

0600 UTC - 2AM EDT / 1AM CDT / 11PM PDT

0600	0615	Sat/Sun	South Africa, Trans World Radio		11640af
0600	0630	mtwhf	France, Radio France International		11725af
			15160af	17800af	17800af
0600	0630		Germany, Deutsche Welle	7310af	15275af
0600	0630		Nigeria, Radio, National Svc/Abuja		7275do
0600	0645	mtwhf	South Africa, Trans World Radio		11640af
0600	0655		South Africa, Channel Africa	7230af	15255af
0600	0657		China, China Radio International		11710af
			11870me	11880as	13660as
			15350as	15465as	17505va
			17710as		17540as
0600	0658		New Zealand, Radio NZ International		9615pa
0600	0658	DRM	New Zealand, Radio NZ International		9890pa
0600	0700		Anguilla, Worldwide Univ Network		6090am
0600	0700		Australia, ABC NT Alice Springs		2310do
			4835do		
0600	0700		Australia, ABC NT Katherine	5025do	
0600	0700		Australia, ABC NT Tennant Creek		4910do
0600	0700		Australia, CVC International	15335as	
0600	0700	Sat/Sun	Australia, Radio Australia	15415as	
0600	0700		Australia, Radio Australia	9660as	12080as
			13630as	13690as	15160as
			15415as	15515pa	17750va
0600	0700		Canada, CFVP Calgary AB	6030na	
0600	0700		Canada, CKZN St John's NF	6160na	
0600	0700		Canada, CKZU Vancouver BC		6160na
0600	0700		Costa Rica, Worldwide Univ Network		5030va
			6150va	7375va	9725va
0600	0700		Cuba, Radio Havana Cuba	6000na	11870va
			6140na	9550na	11760na
0600	0700		Guyana, Voice of Guyana	3291do	
0600	0700		Kuwait, Radio Kuwait	15110me	
0600	0700		Malaysia, RTM/Traxx FM	7295as	
0600	0700		Malaysia, RTM/Voice of Malaysia		6175as
			9750as	15295as	
0600	0700		Nigeria, Radio Nigeria/Kaduna		4770do
0600	0700	vl	Papua New Guinea, Wantok R. Light		7325va
0600	0700		Russia, Voice of Russia	17635pa	21790pa
0600	0700		Swaziland, Trans World Radio		4775af
			6120af	9500af	
0600	0700		UK, BBC World Service	6005af	6190af
			6195va	9860af	11765af
			13820af	15310as	15400af
			17790as		
0600	0700	Sat/Sun	UK, BBC World Service	15420af	
0600	0700	DRM	UK, BBC World Service	6195af	
0600	0700		USA, Armed Forces Radio Network		4319usb
			5446usb	5765usb	6350usb
					7811usb

0600	0700		10320usb	12133usb	13362usb	
0600	0700		USA, KWHR Naalehu HI	11565as	13650as	
			USA, Voice of America	6080af	12080af	
			15580af			
0600	0700		USA, WBCQ Monticello ME	5110am		
0600	0700		USA, WBOH Newport NC	5920am		
0600	0700		USA, WEWN Vandiver AL	7570eu		
0600	0700	Sat/Sun	USA, WHRA Greenbush ME	7490va		
0600	0700		USA, WHRI Cypress Creek SC		5875am	
			7365am			
0600	0700		USA, WRMI Miami FL	9955am		
0600	0700		USA, WTJC Newport NC	9370na		
0600	0700		USA, WWCN Nashville TN	3215na	5070na	
			5890na	5935na		
0600	0700		USA, WWRB Manchester TN	3185va		
0600	0700		USA, WYFR/Family Radio Worldwide		5850na	
			7520va	9680na	11530af	11580va
0600	0700		Uzbekistan, CVC International		15515as	
0600	0700	vl	Vanuatu, Radio Vanatu	3945al	7260do	
0600	0700		Zambia, CVC Intl/Christian Voice		6065af	
			13590af			
0630	0644	mtwhfa	Vatican City, Vatican Radio	5965eu	7250eu	
			9645eu	11740eu	15595eu	
0630	0700		Bulgaria, Radio Bulgaria	7200na	9400eu	
0630	0700		Vatican City, Vatican Radio	11625af	13765af	
			15570af			
0645	0700	Sun	Germany, Trans World Radio Europe		6105eu	
0645	0700	Sun	Monaco, Trans World Radio Europe		9800eu	
0659	0700		New Zealand, Radio NZ International		7145pa	
0659	0700	DRM	New Zealand, Radio NZ International		6170pa	

0700 UTC - 3AM EDT / 2AM CDT / 12AM PDT

0700	0703	vl	Croatia, Croatian Radio	11690pa		
0700	0706		UK, BBC World Service	6005af		
0700	0727		Czech Rep, Radio Prague	9880eu	11600eu	
0700	0727		Slovakia, R Slovakia International		9440pa	
			11650pa			
0700	0730		France, Radio France International		13675af	
0700	0730	mtwhf	UK, BBC World Service	15575as		
0700	0745		USA, WYFR/Family Radio Worldwide		7520va	
0700	0750	mtwhf	Germany, Trans World Radio Europe		6105eu	
0700	0750	mtwhf	Monaco, Trans World Radio Europe		9800eu	
0700	0757		China, China Radio International		11880as	
			13660as	13710eu	15350as	15465as
			17490eu	17540as	17710as	
0700	0800		Anguilla, Worldwide Univ Network		6090am	
0700	0800		Australia, ABC NT Alice Springs		2310do	
			4835do			
0700	0800		Australia, ABC NT Katherine	5025do		
0700	0800		Australia, ABC NT Tennant Creek		4910do	
0700	0800		Australia, CVC International	15335as		
0700	0800		Australia, Radio Australia	9475as	9660as	
			9710as	13630pa	15160as	15240pa
			15415as	17750va		
0700	0800		Bhutan, Bhutan Broadcasting Svc		6035as	
0700	0800		Canada, CFVP Calgary AB	6030na		
0700	0800		Canada, CKZN St John's NF	6160na		
0700	0800		Canada, CKZU Vancouver BC		6160na	
0700	0800		Costa Rica, Worldwide Univ Network		5030va	
			6150va	7375va	9725va	11870va
0700	0800	DRM	Germany, Deutsche Welle	7310eu		
0700	0800	Sun	Germany, Trans World Radio Europe		6105eu	
0700	0800		Guyana, Voice of Guyana	3291do		
0700	0800		Kuwait, Radio Kuwait	15110me		
0700	0800	Sat	Latvia, Radio SWH	9290eu		
0700	0800		Liberia, Star Radio	9525af		
0700	0800		Malaysia, RTM/Traxx FM	7295as		
0700	0800		Malaysia, RTM/Voice of Malaysia		6175as	
			9750as	15295as		
0700	0800	Sun	Monaco, Trans World Radio Europe		9800eu	
0700	0800		Myanmar, Myanma Radio	9731do		
0700	0800		New Zealand, Radio NZ International		7145pa	
0700	0800	DRM	New Zealand, Radio NZ International		6170pa	
0700	0800		Nigeria, Radio Nigeria/Kaduna		4770do	
0700	0800	vl	Papua New Guinea, R East New Britain		3385do	
0700	0800	vl	Papua New Guinea, Wantok R. Light		7325va	
0700	0800		Russia, Voice of Russia	17495af	17635af	
0700	0800	vl	Solomon Islands, SIBC	5020do		
0700	0800		South Africa, Channel Africa	7230af		
0700	0800		Swaziland, Trans World Radio		4775af	
			6120af	9500af		
0700	0800		Taiwan, R Taiwan International		5950na	
0700	0800	Sat/Sun	UK, BBC World Service	15400af	15420af	
			15575as			
0700	0800		UK, BBC World Service	6190af	9860af	
			11760me	13820af	15310as	17790as

0700	0800	mtwhf	17830af			
0700	0800	Sat/Sun	UK, BBC World Service	15400af		
0700	0800		UK, Bible Voice BC	5945eu		
			USA, Armed Forces Radio Network		4319usb	
			5446usb	5765usb	6350usb	7811usb
			10320usb	12133usb	13362usb	
0700	0800		USA, KWHR Naalehu HI	11565as	13650as	
0700	0800		USA, WBCQ Monticello ME	5110am		
0700	0800		USA, WBOH Newport NC	5920am		
0700	0800		USA, WEWN Vandiver AL	7570eu		
0700	0800	mtwhf	USA, WHRI Cypress Creek SC		11565am	
0700	0800		USA, WHRI Cypress Creek SC		7385na	
0700	0800	Sat/Sun	USA, WHRI Cypress Creek SC		5875va	
0700	0800		USA, WRMI Miami FL	9955am		
0700	0800		USA, WTJC Newport NC	9370na		
0700	0800		USA, WWCN Nashville TN	3215na	5070na	
			5890na	5935na		
0700	0800		USA, WWRB Manchester TN	3185va		
0700	0800		USA, WYFR/Family Radio Worldwide		5985na	
			6915na	9505na	9715na	9930af
0700	0800		Uzbekistan, CVC International		15515as	
0700	0800	vl	Vanuatu, Radio Vanatu	3945al	7260do	
0700	0800		Zambia, CVC Intl/Christian Voice		6065af	
			13590af			
0715	0750	Sat	Germany, Trans World Radio Europe		6105eu	
0715	0750	Sat	Monaco, Trans World Radio Europe		9800eu	
0745	0800	vl/ f	UK, Bible Voice BC	5945eu		
0750	0800		Saudi Arabia, BSKSA	17785as		

0800 UTC - 4AM EDT / 3AM CDT / 1AM PDT

0800	0815	Sat	Guam, KTWK/Trans World Radio		11840pa	
0800	0815	Sat/Sun	UK, Bible Voice BC	5945eu		
0800	0820	Sun	Germany, Trans World Radio Europe		6105eu	
0800	0820	Sun	Monaco, Trans World Radio Europe		9800eu	
0800	0825		Malaysia, RTM/Voice of Malaysia		6175as	
			9750as	15295as		
0800	0830		Australia, ABC NT Katherine	5025do		
0800	0830		Australia, ABC NT Tennant Creek		4910do	
0800	0830	mtwhf	Myanmar, Myanma Radio	9731do		
0800	0835		Guam, KTWK/Trans World Radio		11840pa	
0800	0845		USA, WYFR/Family Radio Worldwide		5950ca	
			9930af			
0800	0857		China, China Radio International		11620as	
			11880as	13710eu	15350as	15465as
			17490eu	17540as		
0800	0900		Anguilla, Worldwide Univ Network		6090am	
0800	0900		Australia, ABC NT Alice Springs		2310do	
			4835do			
0800	0900		Australia, CVC International	15335as		
0800	0900		Australia, Radio Australia	9475as	9580va	
			9590va	9710as	12080pa	13630as
			15415as	17750va		
0800	0900		Bhutan, Bhutan Broadcasting Svc		6035as	
0800	0900		Canada, CFVP Calgary AB	6030na		
0800	0900		Canada, CKZN St John's NF	6160na		
0800	0900		Canada, CKZU Vancouver BC		6160na	
0800	0900		Costa Rica, Worldwide Univ Network		5030va	
			6150va	7375va	9725va	11870va
0800	0900		Guyana, Voice of Guyana	3291do		
0800	0900		Malaysia, RTM/Traxx FM	7295as		
0800	0900		New Zealand, Radio NZ International		7145pa	
0800	0900	DRM	New Zealand, Radio NZ International		6170pa	
0800	0900		Nigeria, Radio Nigeria/Kaduna		4770do	
0800	0900		Nigeria, Voice of Nigeria/Lagos		9690af	
0800	0900	vl	Papua New Guinea, R East New Britain		3385do	
0800	0900	vl	Papua New Guinea, Wantok R. Light		7325va	
0800	0900		Russia, Voice of Russia	17495af	17635af	
0800	0900	DRM	Russia, Voice of Russia	12060eu	15545eu	
0800	0900	vl	Solomon Islands, SIBC	5020do		
0800	0900		South Africa, Channel Africa	9625af		
0800	0900	Sun	South Africa, SA Radio League		7205af	
			17570af			
0800	0900		South Korea, KBS World Radio		9570as	
0800	0900		Swaziland, Trans World Radio		4775af	
			6120af	9500af		
0800	0900		UK, BBC World Service	6190af	9860af	
			11760me	15310as	15400af	17640as
			17790af	17830af	21470af	
0800	0900	Sat/Sun	UK, BBC World Service	15575as		
0800	0900		USA, Armed Forces Radio Network		4319usb	
			5446usb	5765usb	6350usb	7811usb
			10320usb	12133usb	13362usb	
0800	0900		USA, KNLS Anchor Point AK	7355as		
0800	0900		USA, KWHR Naalehu HI	11565as		
0800	0900		USA, WBCQ Monticello ME	5110am		
0800	0900		USA, WBOH Newport NC	5920am		

0800	0900	USA, WEWN Vandiver AL	9355as	
0800	0900	USA, WHRI Cypress Creek SC	7385am	
0800	0900	USA, WHRI Cypress Creek SC	11565va	
0800	0900	USA, WHRI Cypress Creek SC	5875va	
0800	0900	USA, WRMI Miami FL	9955am	
0800	0900	USA, WTJC Newport NC	9370na	
0800	0900	USA, WWCR Nashville TN	3215na	5070na
		5890na	5935na	
0800	0900	USA, WWRB Manchester TN	3185va	
0800	0900	USA, WYFR/Family Radio Worldwide	5985na	
		6915na		
0800	0900	Uzbekistan, CVC International	15515as	
0800	0900	Vanuatu, Radio Vanatu	3945al	7260do
0800	0900	Zambia, CVC Intl/Christian Voice	6065af	
		13590af		
0805	0900	Guam, KTW/Trans World Radio	15170as	
0820	0900	Guam, KTW/Trans World Radio	15170as	
0830	0900	Australia, ABC NT Katherine	2485do	
0830	0900	Australia, ABC NT Tennant Creek	2325do	
0830	0900	Guam, KTW/Trans World Radio	15170as	
0830	0900	Lithuania, Radio Vilnius	9710na	

0900 UTC - 5AM EDT / 4AM CDT / 2AM PDT

0900	0926	Czech Rep, Radio Prague	9880eu	9955am
		21745as		
0900	0930	Japan, NHK World/Radio Japan	9625as	
		9825pa	11815as	15590as
0900	0957	China, China Radio International	11620as	
		15210pa	15270eu	15350as
		17570eu	17690pa	17750as
0900	1000	Anguilla, Worldwide Univ Network	6090am	
0900	1000	Australia, ABC NT Alice Springs	2310do	
		4835do		
0900	1000	Australia, ABC NT Katherine	2485do	
0900	1000	Australia, ABC NT Tennant Creek	2325do	
0900	1000	Australia, CVC International	15230as	
0900	1000	Australia, Radio Australia	9475va	9580va
		9590va	9710as	11880as
		12080as	15415as	11945pa
0900	1000	Bhutan, Bhutan Broadcasting Svc	6035as	
0900	1000	Canada, CFVP Calgary AB	6030na	
0900	1000	Canada, CKZN St John's NF	6160na	
0900	1000	Canada, CKZU Vancouver BC	6160na	
0900	1000	Costa Rica, Worldwide Univ Network	5030va	
		6150va	7375va	9725va
		13750va		11870va
0900	1000	Germany, Deutsche Welle	15340as	17705as
0900	1000	Guyana, Voice of Guyana	3291do	
0900	1000	Malaysia, RTM/Traxx FM	7295as	
0900	1000	Netherlands, R Netherlands Worldwide	9795as	
0900	1000	New Zealand, Radio NZ International	7145pa	
0900	1000	New Zealand, Radio NZ International	6170pa	
0900	1000	Nigeria, Radio Nigeria/Kaduna	4770do	
0900	1000	Nigeria, Voice of Nigeria/Lagos	9690af	
0900	1000	Papua New Guinea, R East New Britain	3385do	
0900	1000	Papua New Guinea, Wantok R. Light	7325va	
0900	1000	Saudi Arabia, BSKSA	15250af	
0900	1000	Solomon Islands, SIBC	5020do	
0900	1000	South Africa, Channel Africa	9625af	
0900	1000	UK, BBC World Service	6190af	6195as
		9740as	9860af	11760me
		15400af	15575as	17640af
		17790as	17830af	21470af
0900	1000	Ukraine, R Ukraine International	11550eu	
0900	1000	USA, Armed Forces Radio Network	4319usb	
		5446usb	5765usb	6350usb
		10320usb	12133usb	13362usb
0900	1000	USA, KWHR Naalehu HI	9930as	11565as
0900	1000	USA, WBCQ Monticello ME	5110am	
0900	1000	USA, WBOH Newport NC	5920am	
0900	1000	USA, WEWN Vandiver AL	9355as	
0900	1000	USA, WHRI Cypress Creek SC	7385am	
		9425am		
0900	1000	USA, WRMI Miami FL	9955am	
0900	1000	USA, WTJC Newport NC	9370na	
0900	1000	USA, WWCR Nashville TN	5070na	5890na
		5935na	15825na	
		USA, WWRB Manchester TN	3185va	
		USA, WYFR/Family Radio Worldwide	5940na	
		5985na	6915na	9465as
		Zambia, CVC Intl/Christian Voice	6065af	
		13590af		
0905	1000	Greece, Voice of Greece	9420eu	15605eu
0930	1000	Italy, IRRS	9510va	

1000 UTC - 6AM EDT / 5AM CDT / 3AM PDT

1000	1030	Vietnam, Voice of Vietnam	9840as	12020as
1000	1057	China, China Radio International	6040na	
		11610as	11635as	13590as
		13720as	15190as	15210pa
		15390as	17490eu	17690pa
1000	1057	Netherlands, R Netherlands Worldwide	5955eu	
		11895as	12065as	13820as
1000	1058	New Zealand, Radio NZ International	7145pa	
1000	1100	Anguilla, Worldwide Univ Network	11775am	
1000	1100	Australia, ABC NT Alice Springs	2310do	
		4835do		
1000	1100	Australia, ABC NT Katherine	2485do	
1000	1100	Australia, ABC NT Tennant Creek	2325do	
1000	1100	Australia, CVC International	15230as	
1000	1100	Australia, Radio Australia	9580as	9590va
		9710as	11880as	11945pa
		15415as		12080pa
1000	1100	Canada, CFVP Calgary AB	6030na	
1000	1100	Canada, CKZN St John's NF	6160na	
1000	1100	Canada, CKZU Vancouver BC	6160na	
1000	1100	Costa Rica, Worldwide Univ Network	5030va	
		6150va	7375va	9725va
		13750va		11870va
1000	1100	Guyana, Voice of Guyana	3291do	
1000	1100	India, All India Radio	7270as	13695pa
		15020as	15260as	15410as
		17800as	17895pa	17510pa
1000	1100	Indonesia, Voice of Indonesia	9526va	11784al
1000	1100	Italy, IRRS	9510va	
1000	1100	Malaysia, RTM/Traxx FM	7295as	
1000	1100	New Zealand, Radio NZ International	6170pa	
1000	1100	Nigeria, Radio Nigeria/Kaduna	4770do	
1000	1100	Nigeria, Voice of Nigeria/Lagos	9690af	
1000	1100	North Korea, Voice of Korea	11710am	11735as
		13650as	15180am	
1000	1100	Papua New Guinea, R East New Britain	3385do	
1000	1100	Papua New Guinea, Wantok R. Light	7325va	
1000	1100	Saudi Arabia, BSKSA	15250af	
1000	1100	Solomon Islands, SIBC	5020do	
1000	1100	South Africa, Channel Africa	9625af	
1000	1100	UK, BBC World Service	6195as	9740as
		11760me	15575as	17640af
		17790as	21470af	21660as
1000	1100	UK, BBC World Service	15400af	17830af
1000	1100	USA, Armed Forces Radio Network	4319usb	
		5446usb	5765usb	6350usb
		10320usb	12133usb	13362usb
1000	1100	USA, KNLS Anchor Point AK	6890as	
1000	1100	USA, KWHR Naalehu HI	9930as	11565as
1000	1100	USA, WBCQ Monticello ME	5110am	
1000	1100	USA, WBOH Newport NC	5920am	
1000	1100	USA, WEWN Vandiver AL	9355as	
1000	1100	USA, WHRI Cypress Creek SC	7385am	
		9425am		
1000	1100	USA, WINB Red Lion PA	9265am	
1000	1100	USA, WRMI Miami FL	9955am	
1000	1100	USA, WTJC Newport NC	9370na	
1000	1100	USA, WWCR Nashville TN	5070na	5890na
		5935na	15825na	
		USA, WWRB Manchester TN	3185va	
		USA, WYFR/Family Radio Worldwide	5940na	
		5985na	6915na	9465as
		Zambia, CVC Intl/Christian Voice	6065af	
		13590af		
1015	1045	UK, Bible Voice BC	5985as	
1030	1057	Czech Rep, Radio Prague	9880eu	11665eu
1030	1100	Guam, KSDA/ Adventist World Radio	11780as	
1030	1100	Iran, Voice of the Islamic Rep of Iran	15600as	
		17600as		
1030	1100	Mongolia, Voice of Mongolia	12085as	
1059	1100	New Zealand, Radio NZ International	9655pa	

1100 UTC - 7AM EDT / 6AM CDT / 4AM PDT

1100	1105	Pakistan, Radio Pakistan	15100as	17835as
1100	1127	Iran, Voice of the Islamic Rep of Iran	15600as	
		17600as		
1100	1130	UK, BBC World Service	15400af	
1100	1130	Vietnam, Voice of Vietnam	7285as	
1100	1145	USA, WYFR/Family Radio Worldwide	9550sa	
		9755ca		
1100	1157	China, China Radio International	5955as	
		6040na	11650as	11660as
		11795as	13590as	13620eu
		13645as	17490eu	13720as

1100 1158	DRM	New Zealand, Radio NZ International	6170pa
1100 1200		Anguilla, Worldwide Univ Network	11775am
1100 1200		Australia, ABC NT Alice Springs	2310do
		4835do	
1100 1200		Australia, ABC NT Katherine	2485do
1100 1200		Australia, ABC NT Tennant Creek	2325do
1100 1200		Australia, CVC International	15635as
1100 1200	DRM	Australia, Radio Australia	5995pa
1100 1200		Australia, Radio Australia	5995va
		9475as	9560as
		9590va	11880as
		11945pa	12080as
1100 1200	Sat/Sun	Canada, CBC NQ SW Service	9625na
1100 1200		Canada, CFVP Calgary AB	6030na
1100 1200		Canada, CKZN St John's NF	6160na
1100 1200		Canada, CKZU Vancouver BC	6160na
1100 1200		Costa Rica, Worldwide Univ Network	5030va
		6150va	7375va
		9725va	11870va
		13750va	
1100 1200	Sun	Italy, IRRS	9510va
1100 1200		Malaysia, RTM/Traxx FM	7295as
1100 1200		New Zealand, Radio NZ International	9655pa
1100 1200		Nigeria, Radio Nigeria/Kaduna	4770do
1100 1200		Nigeria, Voice of Nigeria/Lagos	9690af
1100 1200	vl	Papua New Guinea, R East New Britain	3385do
1100 1200	vl	Papua New Guinea, Wantok R. Light	7325va
1100 1200		Saudi Arabia, BSKSA	15250af
1100 1200	vl	Solomon Islands, SIBC	5020do
1100 1200		South Africa, Channel Africa	9625af
1100 1200		Taiwan, R Taiwan International	7445as
1100 1200		UK, BBC World Service	6190af
		9740as	9860af
		11760me	15310as
		15340as	15575as
		17640af	17760as
		17790as	17830af
		21470af	
1100 1200		Ukraine, R Ukraine International	11550eu
1100 1200		USA, Armed Forces Radio Network	4319usb
		5446usb	5765usb
		6350usb	7811usb
		10320usb	12133usb
		13362usb	
1100 1200		USA, KWHR Naalehu HI	9930as
1100 1200		USA, WBCQ Monticello ME	5110am
1100 1200		USA, WBOH Newport NC	5920am
1100 1200		USA, WEWN Vandiver AL	11560as
1100 1200		USA, WHRI Cypress Creek SC	7385am
		9425am	
1100 1200		USA, WINB Red Lion PA	9265am
1100 1200		USA, WRMI Miami FL	9955am
1100 1200		USA, WTJC Newport NC	9370na
1100 1200		USA, WWCR Nashville TN	5935na
		7490na	
		9980na	15825na
1100 1200		USA, WWRB Manchester TN	3185va
1100 1200		USA, WYFR/Family Radio Worldwide	5950na
		5985na	7730sa
		9625sa	
1100 1200		Zambia, CVC Intl/Christian Voice	6065af
		13590af	
1115 1130		UK, Bible Voice BC	5950as
1130 1200		Bulgaria, Radio Bulgaria	11700eu
1130 1200		Guam, KSDA/ Adventist World Radio	15460as
1130 1200		Vatican City, Vatican Radio	15595eu
1157 1200		Netherlands, R Netherlands Worldwide	5955eu

1200 UTC - 8AM EDT / 7AM CDT / 5AM PDT

1200 1230		Australia, HCJB Global	15400as
1200 1230		France, Radio France International	17800af
1200 1230		Japan, NHK World/Radio Japan	6120na
		9625as	9695as
		17585eu	15250af
1200 1230		Saudi Arabia, BSKSA	15250af
1200 1245		USA, WYFR/Family Radio Worldwide	5950na
		5985na	
1200 1256		Romania, R Romania International	15220eu
1200 1257		China, China Radio International	5955as
		9460as	9600as
		9645as	9730as
		9760pa	11650as
		11660as	11760pa
		11980as	13645as
		13650eu	13790eu
		17490eu	
1200 1258		New Zealand, Radio NZ International	9655pa
1200 1259		Netherlands, R Netherlands Worldwide	5955eu
1200 1259		Poland, Polish Radio	7330eu
1200 1300		Anguilla, Worldwide Univ Network	11775am
1200 1300		Australia, ABC NT Alice Springs	2310do
		4835do	
1200 1300		Australia, ABC NT Katherine	2485do
1200 1300		Australia, ABC NT Tennant Creek	2325do
1200 1300		Australia, CVC International	13635as
1200 1300		Australia, Radio Australia	6020va
		9475as	9560pa
		9580va	9590va
		11880as	
		11945pa	
1200 1300	DRM	Australia, Radio Australia	5995va
1200 1300	Sat/Sun	Canada, CBC NQ SW Service	9625na

1200 1300		Canada, CFVP Calgary AB	6030na
1200 1300		Canada, CKZN St John's NF	6160na
1200 1300		Canada, CKZU Vancouver BC	6160na
1200 1300		Costa Rica, Worldwide Univ Network	9725va
		11870va	13750va
1200 1300	vl	Germany, Adventist World Radio Europe	15435as
1200 1300	Sun	Latvia, Radio SWH	9290eu
1200 1300		Malaysia, RTM/Traxx FM	7295as
1200 1300		Nigeria, Radio Nigeria/Kaduna	4770do
1200 1300		Nigeria, Voice of Nigeria/Lagos	9690af
1200 1300	vl	Papua New Guinea, Wantok R. Light	7325va
1200 1300	vl	Solomon Islands, SIBC	5020do
1200 1300		South Korea, KBS World Radio	9650na
1200 1300	f/ DRM	Taiwan, R Taiwan International	9850eu
1200 1300		UK, BBC World Service	6190af
		9740as	9860af
		11750as	11760me
		15310as	15575as
		17640af	17790as
		17830af	21470af
1200 1300		USA, Armed Forces Radio Network	4319usb
		5446usb	5765usb
		6350usb	7811usb
		10320usb	12133usb
1200 1300		USA, KNLS Anchor Point AK	7355as
1200 1300		USA, KWHR Naalehu HI	12130as
1200 1300		USA, Voice of America	6140va
		9645va	9760va
		12075va	
1200 1300		USA, WBCQ Monticello ME	9330am
1200 1300		USA, WBOH Newport NC	5920am
1200 1300		USA, WEWN Vandiver AL	11560as
1200 1300	Sat/Sun	USA, WHRA Greenbush ME	15710va
1200 1300	mtwhf	USA, WHRI Cypress Creek SC	9410na
1200 1300		USA, WHRI Cypress Creek SC	7385am
1200 1300		USA, WINB Red Lion PA	13570am
1200 1300		USA, WRMI Miami FL	9955am
1200 1300		USA, WTJC Newport NC	9370na
1200 1300		USA, WWCR Nashville TN	7490na
		9980na	
		13845na	15825na
1200 1300		USA, WWRB Manchester TN	3185va
1200 1300		USA, WYFR/Family Radio Worldwide	11520as
		11560as	17555sa
		17795ca	
1200 1300		Zambia, CVC Intl/Christian Voice	6065af
		13590af	
1215 1300		Egypt, Radio Cairo	17835as
1228 1300	vl	Vatican City, Vatican Radio	11850as
1230 1300	mtwhfa	Australia, HCJB Global	15540as
1230 1300		Bangladesh, Bangla Betar	7250as
1230 1300		Sweden, Radio Sweden	15240na
1230 1300		Thailand, Radio Thailand	9835va
1230 1300		Turkey, Voice of Turkey	13685va
1230 1300		Vietnam, Voice of Vietnam	9840as
1245 1300	Sat	UK, Bible Voice BC	5950as

1300 UTC - 9AM EDT / 8AM CDT / 6AM PDT

1300 1325		Turkey, Voice of Turkey	13685pa
1300 1329		Czech Rep, Radio Prague	13580eu
1300 1330	mtwhfa	Australia, HCJB Global	15540as
1300 1330		Egypt, Radio Cairo	17835af
1300 1330	Sun	Slovakia, Universal Life	15750as
1300 1357		China, China Radio International	5955as
		9570na	9650na
		9730as	9760pa
		9765as	9870as
		11660as	11760pa
		11980as	13610eu
		13755as	13790eu
		15260na	15440as
1300 1400		Anguilla, Worldwide Univ Network	11775am
1300 1400		Australia, CVC International	13635as
1300 1400		Australia, Radio Australia	6020va
		9580va	9590va
1300 1400	DRM	Australia, Radio Australia	5995va
1300 1400	Sat/Sun	Canada, CBC NQ SW Service	9625na
1300 1400		Canada, CFVP Calgary AB	6030na
1300 1400		Canada, CKZN St John's NF	6160na
1300 1400		Canada, CKZU Vancouver BC	6160na
1300 1400		Costa Rica, Worldwide Univ Network	9725va
		11870va	13750va
1300 1400		Indonesia, Voice of Indonesia	9526va
1300 1400		Malaysia, RTM/Traxx FM	7295as
1300 1400		New Zealand, Radio NZ International	9670pa
1300 1400		Nigeria, Radio Nigeria/Kaduna	4770do
1300 1400		Nigeria, Voice of Nigeria/Lagos	9690af
1300 1400		North Korea, Voice of Korea	3560eu
		9335am	
		11710na	13760eu
		15245eu	
1300 1400	vl	Papua New Guinea, Wantok R. Light	7325va
1300 1400	vl	Solomon Islands, SIBC	5020do
1300 1400		South Korea, KBS World Radio	9570na
		9770as	
1300 1400		UK, BBC World Service	6190af
		9740as	9860af
		11750as	11760me
		15310as	15420af
		15575as	17640af

1300	1400		17790as USA, Armed Forces Radio Network 5446usb 5765usb 6350usb 7811usb 10320usb 12133usb 13362usb	21470af 4319usb
1300	1400	mtwhf	USA, KWHR Naalehu HI	9930as
1300	1400	Sat/Sun	USA, KWHR Naalehu HI	12130as
1300	1400		USA, Voice of America	9645va 9760va
1300	1400		USA, WBCQ Monticello ME	9330am
1300	1400		USA, WBOH Newport NC	5920am
1300	1400		USA, WEWN Vandiver AL	11560as
1300	1400	Sat/Sun	USA, WHRA Greenbush ME	15710va
1300	1400		USA, WHRI Cypress Creek SC	9840na
1300	1400		11785am	
1300	1400		USA, WINB Red Lion PA	13570am
1300	1400		USA, WRMI Miami FL	9955am
1300	1400		USA, WTJC Newport NC	9370na
1300	1400		USA, WWCR Nashville TN	7490na 9980na
1300	1400		13845na 15825na	
1300	1400		USA, WWRB Manchester TN	9285va
1300	1400		USA, WYFR/Family Radio Worldwide	11560as
1300	1400		11820na 11865na 11910na	17630af
1300	1400		17715af 17795ca	
1300	1400	vl	Vatican City, Vatican Radio	11850as
1300	1400		Zambia, CVC Intl/Christian Voice	6065af
1300	1400		13590af	
1305	1320	m	Austria, Radio Austria International	13730eu
1305	1330	Sat/Sun	Austria, Radio Austria International	13730eu
1310	1340		Japan, NHK World/Radio Japan	11985as
1330	1357	fa/ DRM	Czech Rep, Radio Prague	9850eu
1330	1400	mtwhf	Guam, KSDA/ Adventist World Radio	15275as
1330	1400		India, All India Radio	9690as 11620as
1330	1400		13710as	
1330	1400		Laos, National Radio	7145as
1330	1400		Sweden, Radio Sweden	15735va
1330	1400		Vietnam, Voice of Vietnam	9840as 12020as
1335	1400	Sat/Sun	Austria, Radio Austria International	13730eu
1345	1400	hf	Austria, Radio Austria International	13730eu
1355	1400		Guam, KTRW/Trans World Radio	9975as

1400 UTC - 10AM EDT / 9AM CDT / 7AM PDT

1400	1430	Sun	Australia, HCJB Global	15425as
1400	1430	mtwhfa	Australia, HCJB Global	15400as
1400	1430	sw	Germany, Pan American BC	15205as
1400	1430	mhf	Guam, KTRW/Trans World Radio	9975as
1400	1430	Sun	Italy, IRRS	15725va
1400	1430		Japan, NHK World/Radio Japan	11705va
1400	1430		11985as 13630eu 21560eu	
1400	1430		Thailand, Radio Thailand	9805va
1400	1430	Sun	United Arab Emirates, FEBA	12025as
1400	1457		China, China Radio International	5995as
1400	1457		9765as 9870as 11675as 11765as	13790eu
1400	1457		13685af 13710eu 13740na	
1400	1457		17630af	
1400	1457		Czech Rep, Radio Prague	9955am
1400	1500		Anguilla, Worldwide Univ Network	11775am
1400	1500		Australia, CVC International	13635as
1400	1500		Australia, Radio Australia	5995va 6080va
1400	1500		7240va 9590va	
1400	1500	Sat/Sun	Bhutan, Bhutan Broadcasting Svc	6035as
1400	1500		Canada, CBC NQ SW Service	9625na
1400	1500		Canada, CFVP Calgary AB	6030na
1400	1500		Canada, CKZN St John's NF	6160na
1400	1500		Canada, CKZU Vancouver BC	6160na
1400	1500		Costa Rica, Worldwide Univ Network	9725va
1400	1500		11870va 13750va	
1400	1500	DRM	Germany, CVC Intl/Voice Africa	7270eu
1400	1500		Germany, The Overcomer Ministries	6110eu
1400	1500		13810va	
1400	1500	tw	Guam, KTRW/Trans World Radio	9975as
1400	1500		India, All India Radio	9690as 11620as
1400	1500		13710as	
1400	1500		Jordan, Radio Jordan	11690na
1400	1500		Libya, Voice of Africa	17725af 21695af
1400	1500		Malaysia, RTM/Traxx FM	7295as
1400	1500		Netherlands, R Netherlands Worldwide	5830as
1400	1500		9885as 11835as	
1400	1500		New Zealand, Radio NZ International	6170pa
1400	1500		Nigeria, Radio Nigeria/Kaduna	4770do
1400	1500		Nigeria, Voice of Nigeria/Lagos	9690af
1400	1500		Oman, Radio Oman	15140as
1400	1500	vl	Papua New Guinea, Wantok R. Light	7325va
1400	1500	DRM	Russia, Voice of Russia	9750eu
1400	1500		Russia, Voice of Russia	7165as 7255as
1400	1500		9625as 9660as 9745as	11755as
1400	1500		15605as 15660as	
1400	1500	vl	Solomon Islands, SIBC	5020do 9545al
1400	1500		UK, BBC World Service	5980as 6190af

			6195as	9740as	11920as	12095as
			15310as	17640af	17830af	21470af
1400	1500	Sat/Sun	UK, Bible Voice BC		15680as	
1400	1500		USA, Armed Forces Radio Network			4319usb
			5446usb	5765usb	6350usb	7811usb
			10320usb	12133usb	13362usb	
1400	1500		USA, KJES Vado NM		11715na	
1400	1500		USA, KNLS Anchor Point AK		7355as	
1400	1500		USA, KWHR Naalehu HI		9930as	
1400	1500		USA, Voice of America		4930af	6080af
			7430va	9345as	9760va	13750af
			15530va	15580af	17530af	17740va
1400	1500		USA, WBCQ Monticello ME		9930am	
1400	1500		USA, WBOH Newport NC		5920am	
1400	1500		USA, WEWN Vandiver AL		15855as	
1400	1500	Sat/Sun	USA, WHRA Greenbush ME		15195va	
1400	1500		USA, WHRI Cypress Creek SC			9495na
			9840na	11785am		
1400	1500		USA, WINB Red Lion PA		13570am	
1400	1500		USA, WRMI Miami FL		9955na	
1400	1500		USA, WTJC Newport NC		9370na	
1400	1500		USA, WWCR Nashville TN		7490na	9980na
			13845na	15825na		
1400	1500		USA, WWRB Manchester TN		9385va	
1400	1500		USA, WYFR/Family Radio Worldwide			11560na
			11830na	11910na	13695na	17630af
			17715af	17795ca		
1400	1500	vl	Vatican City, Vatican Radio		11850as	
1400	1500		Zambia, CVC Intl/Christian Voice			6065af
			13590af			
1415	1430	mtwhfa	Germany, Pan American BC		15205as	
1415	1430		Nepal, Radio Nepal		5005as	
1430	1445	Sun	Germany, Pan American BC		15205as	
1430	1459		Vatican City, Vatican Radio		4885eu	7250eu
			9645eu			
1430	1500	mtwhfa	Albania, Radio Tirana		13640na	
1430	1500		Australia, Radio Australia		9475va	11660pa
1430	1500		Ethiopia, Radio Ethiopia		5990af	7110af
			9704af			
1430	1500	Sat	Italy, IRRS	15725va		
1430	1500	f/ DRM	South Korea, KBS World Radio			9460eu
1430	1500		Sweden, Radio Sweden		13820va	13840va
			15240na			

1500 UTC - 11AM EDT / 10AM CDT / 8AM PDT

1500	1510	mtwhfa	Turkmenistan, Turkmen Radio	5015eu
1500	1528		Vietnam, Voice of Vietnam	7285va 9840va
1500	1530		12020va	
1500	1530		Guam, KSDA/ Adventist World Radio	11985as
1500	1530		Nigeria, Radio, National Svc/Abuja	7275do
1500	1530		UK, BBC World Service	7380af 11860af
1500	1530		15420af	
1500	1530	Sat/Sun	UK, Sudan Radio Service	9840af
1500	1530	vl	Venezuela, R Nacional de Venezuela	11680sa
1500	1545		USA, WYFR/Family Radio Worldwide	15770sa
1500	1550		New Zealand, Radio NZ International	6170pa
1500	1550	vl	Vatican City, Vatican Radio	11850as
1500	1555		South Africa, Channel Africa	15215af
1500	1557		Canada, R Canada International	11675as
1500	1557		17720as	
1500	1557		China, China Radio International	5955as
1500	1557		6100af 7160as 7325as 9800as	
1500	1557		9870as 11965eu 13640eu 13685af	
1500	1557		13740na 17630af	
1500	1557		Netherlands, R Netherlands Worldwide	5830af
1500	1557		9885as 11835as	
1500	1600		Anguilla, Worldwide Univ Network	11775am
1500	1600		Australia, CVC International	13635as
1500	1600		Australia, Radio Australia	5995va 6080va
1500	1600		7240as 9475va 9590as	11660pa
1500	1600	Sat/Sun	Canada, CBC NQ SW Service	9625na
1500	1600		Canada, CFVP Calgary AB	6030na
1500	1600		Canada, CKZN St John's NF	6160na
1500	1600		Canada, CKZU Vancouver BC	6160na
1500	1600		Costa Rica, Worldwide Univ Network	9725va
1500	1600		11870va 13750va	
1500	1600		Finland, Overcomer Ministries	9595me
1500	1600	vl	Germany, Adventist World Radio Europe	15225as
1500	1600	DRM	Germany, CVC Intl/Voice Africa	7270eu
1500	1600		Germany, The Overcomer Ministries	6110eu
1500	1600		17485af	
1500	1600		Italy, IRRS	9825af
1500	1600		Jordan, Radio Jordan	11690na
1500	1600		Libya, Voice of Africa	17725af 21695af
1500	1600		Malaysia, RTM/Traxx FM	7295as
1500	1600		Myanmar, Myanma Radio	5985as
1500	1600		Nigeria, Radio Nigeria/Kaduna	4770do

1500 1600	Nigeria, Voice of Nigeria/Lagos	9690af	
1500 1600	North Korea, Voice of Korea	3560eu	9335na
	11710eu	13760eu	15245eu
1500 1600 vl	Papua New Guinea, Wantok R. Light	7325va	
1500 1600	Russia, Voice of Russia	4965va	9810eu
1500 1600 vl	Slovakia, Miraya FM Radio	15650af	
1500 1600 vl	Solomon Islands, SIBC	5020do	9545al
1500 1600	Uganda, Dunamis Shortwave	4750af	
1500 1600	UK, BBC World Service	5975as	5980as
	6190af	6195as	9740as
	11920as	12095va	15310as
	17640af	17830af	21470af
1500 1600 Sat/Sun	UK, BBC World Service	7380af	15420af
1500 1600	USA, Armed Forces Radio Network	4319usb	
	5446usb	5765usb	6350usb
	10320usb	12133usb	13362usb
1500 1600	USA, KJES Vado NM	11715na	
1500 1600	USA, KWHR Naalehu HI	9930as	
1500 1600	USA, Voice of America	6160va	7125va
	7430va	9345as	9695va
	12150va	13570af	15310va
	15550va	15580va	17895af
1500 1600	USA, WBCQ Monticello ME	9930am	
1500 1600	USA, WBOH Newport NC	5920am	
1500 1600	USA, WEWN Vandiver AL	15855as	
1500 1600 Sat/Sun	USA, WHRA Greenbush ME	15195va	
1500 1600	USA, WHRI Cypress Creek SC	9495na	
	9840na	11785am	
1500 1600	USA, WINB Red Lion PA	13570am	
1500 1600	USA, WRMI Miami FL	9955na	
1500 1600	USA, WTJC Newport NC	9370na	
1500 1600	USA, WWCR Nashville TN	7490na	9980na
	13845na	15825na	
1500 1600	USA, WWRB Manchester TN	9385va	
1500 1600	USA, WYFR/Family Radio Worldwide	6280as	
	11830na	11910na	17795ca
1500 1600	Zambia, CVC Intl/Christian Voice	6065af	
	13590af		
1505 1520 m	Austria, Radio Austria International	13775na	
1505 1530 Sat/Sun	Austria, Radio Austria International	13775na	
1505 1557	Canada, R Canada International	9515as	
	17720as	11675as	
1515 1530 twhf	Austria, Radio Austria International	13775na	
1515 1545 smtwhf	Swaziland, Trans World Radio	4760af	
	6065af		
1530 1558	Vatican City, Vatican Radio	13765eu	15235eu
1530 1600	Iran, Voice of the Islamic Rep of Iran	7375as	
	9600as		
1530 1600	Mongolia, Voice of Mongolia	12085as	
1530 1600	Sweden, Radio Sweden	11590va	
1530 1600 Sun	UK, Bible Voice BC	13590me	
1530 1600 ha	UK, Bible Voice BC	15680as	
1530 1600 mtwhf	UK, Sudan Radio Service	9840af	
1535 1600 Sat/Sun	Austria, Radio Austria International	13775na	
1540 1600 mtwhf	UK, Bible Voice BC	13590me	
1545 1600 mtwhf	Austria, Radio Austria International	13775na	
1545 1600 Sat	UK, Bible Voice BC	13590me	
1551 1600 DRM	New Zealand, Radio NZ International	6170pa	
1551 1600	New Zealand, Radio NZ International	7145pa	

1600 UTC - 12PM EDT / 11AM CDT / 9AM PDT

1600 1615	Pakistan, Radio Pakistan	9385va	11565va
	15625af		
1600 1615 twha	UK, Bible Voice BC	13590me	
1600 1627	Czech Rep, Radio Prague	5930eu	17485af
1600 1627	Iran, Voice of the Islamic Rep of Iran	7375as	
	9600as		
1600 1628	Vietnam, Voice of Vietnam	7220va	7280va
	9550va	9730va	
1600 1630 Sun	Germany, Pan American BC	13830me	
1600 1630	Guam, KSDA/ Adventist World Radio	11805as	
	11985as		
1600 1630	Myanmar, Myanma Radio	9730do	
1600 1630	Nigeria, Voice of Nigeria/Lagos	9690af	
1600 1630 Sat/Sun	Swaziland, Trans World Radio	6065af	
1600 1630	Yemen, Rep of Yemen Radio	9780me	
1600 1645	USA, WYFR/Family Radio Worldwide	11830na	
	11865na		
1600 1657	Canada, R Canada International	9515as	
1600 1657	China, China Radio International	6100af	
	6180me	9570af	9760me
	11940eu	11965eu	13760eu
1600 1658	Germany, Deutsche Welle	6170as	9540as
	15640as		
1600 1659	Finland, Overcomer Ministries	9595me	
1600 1700	Anguilla, Worldwide Univ Network	11775am	
1600 1700	Australia, CVC International	13635as	

1600 1700	Australia, Radio Australia	5995va	6080va
	7240as	9475va	9710pa
1600 1700 Sat	Canada, CBC NQ SW Service	9625na	
1600 1700	Canada, CFVP Calgary AB	6030na	
1600 1700	Canada, CKZN St John's NF	6160na	
1600 1700	Canada, CKZU Vancouver BC	6160na	
1600 1700 DRM	Canada, R Canada International	9800na	
1600 1700	Costa Rica, Worldwide Univ Network	11870va	
	13750va		
1600 1700	Egypt, Radio Cairo	12170af	
1600 1700	Ethiopia, Radio Ethiopia	7165af	9560af
1600 1700	France, Radio France International	15605af	
	17605af		
1600 1700	Italy, IRRS	9825af	
1600 1700	Malaysia, RTM/Traxx FM	7295as	
1600 1700 DRM	New Zealand, Radio NZ International	6170pa	
1600 1700	New Zealand, Radio NZ International	7145pa	
1600 1700	Nigeria, Radio Nigeria/Kaduna	4770do	
1600 1700	North Korea, Voice of Korea	9990va	11545va
1600 1700 vl	Papua New Guinea, Wantok R. Light	7325va	
1600 1700	Russia, Voice of Russia	4975me	6070as
	7350as	9405as	9890eu
	12055as	13855va	
1600 1700 vl	Rwanda, Radio Rwanda	6055do	
1600 1700 vl	Slovakia, Miraya FM Radio	15650af	
1600 1700 vl	Solomon Islands, SIBC	5020do	9545al
1600 1700	South Korea, KBS World Radio	9515eu	
1600 1700	Taiwan, R Taiwan International	11550as	
	15515as		
1600 1700	Uganda, Dunamis Shortwave	4750af	
1600 1700	UK, BBC World Service	3255af	5975as
	6190af	9625as	11920as
	15400af	15420af	17640af
	17830af	21470af	
1600 1700 Sat/Sun	UK, BBC World Service	7380af	
1600 1700 fs	UK, Bible Voice BC	13590me	
1600 1700	USA, Armed Forces Radio Network	4319usb	
	5446usb	5765usb	6350usb
	10320usb	12133usb	13362usb
1600 1700	USA, KWHR Naalehu HI	9930as	
1600 1700	USA, Voice of America	4930af	6080af
	12080va	13600va	13615va
	15580af	17895va	
1600 1700	USA, WBCQ Monticello ME	9930am	
1600 1700	USA, WBOH Newport NC	5920am	
1600 1700	USA, WEWN Vandiver AL	15855as	
1600 1700	USA, WHRA Greenbush ME	17520af	
1600 1700	USA, WHRI Cypress Creek SC	9495am	
	9840na	11785am	
1600 1700	USA, WINB Red Lion PA	13570am	
1600 1700	USA, WRMI Miami FL	9955am	
1600 1700	USA, WTJC Newport NC	9370na	
1600 1700	USA, WWCR Nashville TN	9980na	12160na
	13845na	15825na	
1600 1700	USA, WWRB Manchester TN	9385va	12180va
1600 1700 Sun	USA, WWRB Manchester TN	11920af	
1600 1700	USA, WYFR/Family Radio Worldwide	6085ca	
	13695na	17795ca	18980va
	21455va		
1600 1700	Zambia, CVC Intl/Christian Voice	4965af	
	13590af		
1615 1629	Vatican City, Vatican Radio	5885eu	7250eu
	9645eu	15595eu	
1615 1630 h	UK, Bible Voice BC	13590me	
1615 1645 mtwhf	Swaziland, Trans World Radio	6130af	
1615 1700 Sun	UK, BBC World Service	11860af	
1615 1700 ta	UK, Bible Voice BC	13590me	
1630 1645 h	UK, Bible Voice BC	13590me	
1630 1657	Slovakia, R Slovakia International	5920eu	
	6055eu		
1630 1700 vl	Guam, KSDA/ Adventist World Radio	11650as	
1630 1700	Nigeria, Voice of Nigeria/Lagos	15120af	
1630 1700 Sat/Sun	Swaziland, Trans World Radio	6130af	
1630 1700 Sat	UK, BBC World Service	11860af	
1640 1650 mtwhfa	Turkmenistan, Turkmen Radio	4930eu	
1645 1700	Tajikistan, Tajik Radio	7245as	

1700 UTC - 1PM EDT / 12PM CDT / 10AM PDT

1700 1705	Canada, R Canada International	9515as	
1700 1705 DRM	Canada, R Canada International	9800na	
1700 1715 t/ vl	UK, Bible Voice BC	13590me	
1700 1720 twhfa	Moldova, Radio PMR/Pridnestrovie	6235eu	
1700 1727	Czech Rep, Radio Prague	5930eu	17485af
1700 1730	Jordan, Radio Jordan	11690na	
1700 1730 DRM	Romania, R Romania International	7460eu	
1700 1730 Sat	UK, Bible Voice BC	13590me	
1700 1730	USA, Voice of America	6080af	11835af

1700	1730	Sat	15580af	USA, WRMI Miami FL	15650af	
1700	1740	f		Moldova, Radio PMR/Pridnestrovie	6235eu	
1700	1745			UK, BBC World Service	6005af	9410af
1700	1755			South Africa, Channel Africa	15235af	
1700	1756			Romania, R Romania International		11735eu
1700	1757			China, China Radio International	6100af	
			6145eu	7130as	7265me	7315me
			7335eu	9570af	9595eu	11900af
			11940eu	13760eu		
1700	1757	DRM		Netherlands, R Netherlands Worldwide	5955eu	
1700	1759			Poland, Polish Radio	7140eu	7265eu
1700	1800			Anguilla, Worldwide Univ Network		11775am
1700	1800			Australia, CVC International	13635as	
1700	1800			Australia, Radio Australia	5995va	6080va
			9475as	9580va	9710as	11880as
1700	1800	Sat		Canada, CBC NQ SW Service	9625na	
1700	1800			Canada, CFVP Calgary AB	6030na	
1700	1800			Canada, CKZN St John's NF	6160na	
1700	1800			Canada, CKZU Vancouver BC		6160na
1700	1800			Costa Rica, Worldwide Univ Network	11870va	
			13750va			
1700	1800			Egypt, Radio Cairo	12170af	
1700	1800			Equatorial Guinea, Radio Africa		15190af
1700	1800			Italy, IRRS	9825af	
1700	1800			Malaysia, RTM/Traxx FM	7295as	
1700	1800	DRM		New Zealand, Radio NZ International		6170pa
1700	1800			New Zealand, Radio NZ International		7145pa
1700	1800			Nigeria, Radio Nigeria/Kaduna	4770do	
1700	1800			Nigeria, Voice of Nigeria/Lagos	15120af	
1700	1800	vl		Papua New Guinea, Wantok R. Light	7325va	
1700	1800	Sat		Russia, Voice of Russia	9820eu	9890eu
1700	1800			Russia, Voice of Russia	4975me	7350as
			9405as	11510af	11985af	
1700	1800	Sat/Sun		Russia, Voice of Russia	6000eu	7320eu
			7340eu			
1700	1800	vl		Rwanda, Radio Rwanda	6055do	
1700	1800	vl		Slovakia, Miraya FM Radio	15650af	
1700	1800	vl		Solomon Islands, SIBC	5020eu	9545al
1700	1800			Swaziland, Trans World Radio		3200af
			9500af			
1700	1800			Taiwan, R Taiwan International		11705af
			15690af			
1700	1800			Uganda, Dunamis Shortwave	4750af	
1700	1800			UK, BBC World Service	3255af	5975as
			6190af	6195va	7380af	9625as
			12095af	13675af	15400af	17795af
			17830af			
1700	1800	fas		UK, Bible Voice BC	9430me	13590me
1700	1800			USA, Armed Forces Radio Network		4319usb
			5446usb	5765usb	6350usb	7811usb
			10320usb	12133usb	13362usb	
1700	1800			USA, KWHR Naalehu HI	9930as	
1700	1800	Sat/Sun		USA, Voice of America	15675af	
1700	1800			USA, WBCQ Monticello ME	9330am	15420am
1700	1800			USA, WBOH Newport NC	5920am	
1700	1800			USA, WEWN Vandiver AL	15855as	
1700	1800			USA, WHRA Greenbush ME	17520af	
1700	1800			USA, WHRI Cypress Creek SC		9495am
			9840na	11785am		
1700	1800			USA, WINB Red Lion PA	13570am	
1700	1800			USA, WRMI Miami FL	9955am	
1700	1800			USA, WTJC Newport NC	9370na	
1700	1800			USA, WWCR Nashville TN	9980na	12160na
			13845na	15825na		
1700	1800	Sun		USA, WWRB Manchester TN	11920af	
1700	1800			USA, WWRB Manchester TN	9385va	12180va
1700	1800			USA, WYFR/Family Radio Worldwide		13690na
			17795ca	18980ca	21455va	
1700	1800			Zambia, CVC Intl/Christian Voice		4965af
			13590af			
1720	1740	Sat/Sun		USA, Voice of America	4930af	11605af
			13755af	15775af		
1730	1757			Vatican City, Vatican Radio	11625af	12765af
			15570af			
1730	1800			Bulgaria, Radio Bulgaria	7200eu	9400eu
1730	1800			Guam, KSDA/ Adventist World Radio		9980as
1730	1800			Swaziland, Trans World Radio		9500af
1730	1800	whf		Sweden, Radio Sweden	6065va	
1730	1800	mtwhf		UK, Sudan Radio Service	9840af	
1730	1800			USA, Voice of America	5980va	5995va
			6080af	9570va	11605va	15410af
			15580af			
1730	1800	mtwhf		USA, Voice of America	4930af	11605af
			15775af			
1745	1800			Bangladesh, Bangla Betar	7250as	
1745	1800			India, All India Radio	7410eu	9445af
			9950eu	11620eu	11935af	13605af
			15075af	15155af	17670af	

1800 UTC - 2PM EDT / 1PM CDT / 11AM PDT

1800	1809			Tanzania, Tanzania Broadcasting Corp	11735af	
1800	1815	Sun		UK, Bible Voice BC	13590me	
1800	1815	Sat		UK, Bible Voice BC	11875me	
1800	1828			Vietnam, Voice of Vietnam	9765eu	
1800	1830	w		Austria, Adventist World Radio Europe	15315af	
1800	1830			Nigeria, Radio, National Svc/Abuja	7275do	
1800	1830			South Africa, AWR Africa	3215af	3345af
				9610af		
1800	1830			UK, BBC World Service	5975as	
1800	1830	Sat		UK, Bible Voice BC	9430me	13590me
1800	1830	Sun		UK, Bible Voice BC	6130eu	
1800	1830			USA, Voice of America	6080af	15410af
				15580af	17865af	
1800	1845	Sat		UK, Bible Voice BC	6130eu	
1800	1850	DRM		New Zealand, Radio NZ International	6170pa	
1800	1850			New Zealand, Radio NZ International	7145pa	
1800	1857			China, China Radio International	7120eu	
				9600eu	13760eu	
1800	1857			Netherlands, R Netherlands Worldwide	6020af	
				11660af	15535af	
1800	1859			Canada, R Canada International	9530af	
				11765af	17735af	17810af
1800	1900			Anguilla, Worldwide Univ Network		11775am
1800	1900	mtwhf		Argentina, RAE	9690am	15345am
1800	1900			Australia, Radio Australia	6080va	7240as
				9475va	9580as	9710as
1800	1900			Bangladesh, Bangla Betar	7250eu	
1800	1900			Canada, CFVP Calgary AB	6030na	
1800	1900			Canada, CKZN St John's NF	6160na	
1800	1900			Canada, CKZU Vancouver BC		6160na
1800	1900			Costa Rica, Worldwide Univ Network	11870va	
				13750va		
1800	1900			Equatorial Guinea, Radio Africa		15190af
1800	1900			India, All India Radio	7410eu	9445af
				9950eu	11620eu	11935af
				15075af	15155af	17670af
1800	1900	fas		Italy, IRRS	7290va	
1800	1900			Kuwait, Radio Kuwait	11990va	
1800	1900			Malaysia, RTM/Traxx FM	7295as	
1800	1900			Netherlands, R Netherlands Worldwide	7395af	
1800	1900			Nigeria, Radio Nigeria/Kaduna	4770do	
1800	1900			Nigeria, Voice of Nigeria/Lagos	15120af	
1800	1900			North Korea, Voice of Korea	3560eu	13760eu
1800	1900	vl		Papua New Guinea, Wantok R. Light	7325va	
1800	1900			Russia, Voice of Russia	9480eu	9745af
				9850af	9890eu	
1800	1900	vl		Rwanda, Radio Rwanda	6055do	
1800	1900	vl		Solomon Islands, SIBC	5020do	9545al
1800	1900			South Korea, KBS World Radio		7275eu
1800	1900			Swaziland, Trans World Radio		3200af
				9500af		
1800	1900			Taiwan, R Taiwan International		3965eu
1800	1900			Uganda, Dunamis Shortwave	4750af	
1800	1900			UK, BBC World Service	3255af	5895va
				5995as	6190af	6195va
				9485as	12095af	13675va
				17795af	17830af	15400af
1800	1900	DRM		UK, BBC World Service	5875eu	
1800	1900	Sun		UK, Bible Voice BC	9430me	
1800	1900			USA, Armed Forces Radio Network		4319usb
				5446usb	5765usb	6350usb
				10320usb	12133usb	13362usb
1800	1900			USA, WBCQ Monticello ME	7415am	9330am
				15420am		
1800	1900			USA, WBOH Newport NC	5920am	
1800	1900			USA, WEWN Vandiver AL	15855as	
1800	1900			USA, WHRA Greenbush ME	17690af	
1800	1900	mtwhf		USA, WHRI Cypress Creek SC		17520af
1800	1900	Sat/Sun		USA, WHRI Cypress Creek SC		9495am
1800	1900			USA, WHRI Cypress Creek SC		9840na
				11785am		
1800	1900			USA, WINB Red Lion PA	13570am	
1800	1900			USA, WRMI Miami FL	9955am	
1800	1900			USA, WTJC Newport NC	9370na	
1800	1900			USA, WWCR Nashville TN	9980na	12160na
				13845na	15825na	
1800	1900	Sun		USA, WWRB Manchester TN	11920af	
1800	1900			USA, WWRB Manchester TN	9385va	12180va
1800	1900			USA, WYFR/Family Radio Worldwide		6180va
				11775eu	13615na	13690na
				17795ca	17845af	18980va
1800	1900			Yemen, Rep of Yemen Radio	9780me	
1800	1900			Zambia, CVC Intl/Christian Voice		4965af
				13590af		
1820	1840	Sat/Sun		USA, Voice of America	4930af	11605af
				15775af		

1830	1857	Slovakia, R Slovakia International	5920eu	
		6055eu		
1830	1900	Turkey, Voice of Turkey	9785eu	
1830	1900	UK, BBC World Service	6005af	9410af
1830	1900 f	UK, Bible Voice BC	9430me	
1830	1900 Sun	UK, Bible Voice BC	6130eu	
1830	1900	USA, Voice of America	4930af	6080af
		9820va	9520va	9885af
		11805va	15410af	11755va
				15580af
1845	1900 mtwhfa	Albania, Radio Tirana	7430eu	13640eu
1845	1900 Sun	UK, Bible Voice BC	11830af	
1851	1900 DRM	New Zealand, Radio NZ International	9890pa	
1851	1900	New Zealand, Radio NZ International	9615pa	

1900 UTC - 3PM EDT / 2PM CDT / 12PM PDT

1900	1925	Turkey, Voice of Turkey	9785eu	
1900	1928	Vietnam, Voice of Vietnam	7280va	9730va
1900	1930	Germany, Deutsche Welle	9565af	11795af
		17860af		
1900	1930 Sun	UK, Bible Voice BC	6130eu	13710af
1900	1930 mtwhf	USA, Voice of America	11605af	15775af
1900	1935 DRM	New Zealand, Radio NZ International	9890pa	
1900	1945	India, All India Radio	7410eu	9445af
		9950eu	11620eu	11935af
			15075af	17670af
				15535af
1900	1945	USA, WYFR/Family Radio Worldwide	6085ca	
1900	1950	New Zealand, Radio NZ International	9615pa	
1900	1957	China, China Radio International	7295va	
		9435va		
1900	1957	Netherlands, R Netherlands Worldwide	5905af	
		7425af	11660af	15335af
1900	2000	Anguilla, Worldwide Univ Network	11775am	
1900	2000	Australia, Radio Australia	6080va	7240as
		9500va	9580va	9710as
				11880as
1900	2000	Canada, CFVP Calgary AB	6030na	
1900	2000	Canada, CKZN St John's NF	6160na	
1900	2000	Canada, CKZU Vancouver BC		6160na
1900	2000	Costa Rica, Worldwide Univ Network	11870va	
		13750va		
1900	2000	Egypt, Radio Cairo	9300af	
1900	2000	Equatorial Guinea, Radio Africa		15190af
1900	2000	Finland, Overcomer Ministries	6060eu	
1900	2000	Germany, The Overcomer Ministries	6175eu	
1900	2000 fas	Italy, IRRS	7290va	
1900	2000	Kuwait, Radio Kuwait	11990va	
1900	2000	Malaysia, RTM/Traxx FM	7295as	
1900	2000	Netherlands, R Netherlands Worldwide	7395af	
1900	2000	Nigeria, Radio Nigeria/Kaduna	4770do	
1900	2000	Nigeria, Voice of Nigeria/Lagos	15120af	
1900	2000	North Korea, Voice of Korea	7100af	9975va
		11535va	11910af	
1900	2000 vl	Papua New Guinea, Wantok R. Light	7325va	
1900	2000	Russia, Voice of Russia	7310eu	7195eu
		7310eu		
1900	2000 vl	Rwanda, Radio Rwanda	6055do	
1900	2000 vl	Solomon Islands, SIBC	5020do	
1900	2000	South Africa, SA Radio League	3215af	
1900	2000 mtwhf	Spain, Radio Exterior Espana	9665eu	11620af
1900	2000	Swaziland, Trans World Radio	9500af	3200af
1900	2000	Thailand, Radio Thailand	7155eu	
1900	2000 vl	Uganda, UBC Radio	4976do	5026do
1900	2000	UK, BBC World Service	3255af	5875va
		5995as	6005af	6190af
		9485as	12095af	15400af
			17830af	17795af
1900	2000 DRM	UK, BBC World Service	5875eu	
1900	2000	Ukraine, R Ukraine International	7490eu	
1900	2000	USA, Armed Forces Radio Network	4319usb	
		5446usb	5765usb	6350usb
		10320usb	12133usb	13362usb
1900	2000	USA, KJES Vado NM	15385na	
1900	2000	USA, Voice of America	4930af	6080af
		7480va	9670va	9885af
			15580af	17895af
				15410af
1900	2000	USA, WBCQ Monticello ME	7415am	9330am
		15420am		
1900	2000	USA, WBOH Newport NC	5920am	
1900	2000	USA, WEWN Vandiver AL	17595af	
1900	2000	USA, WHRA Greenbush ME	17690af	
1900	2000 Sat	USA, WHRI Cypress Creek SC		9495am
1900	2000	USA, WHRI Cypress Creek SC		11785am
1900	2000	USA, WINB Red Lion PA	13570am	
1900	2000	USA, WRMI Miami FL	9955am	
1900	2000	USA, WTJC Newport NC	9370na	
1900	2000	USA, WWCN Nashville TN	9980na	12160na
		13845na	15825na	

1900	2000	USA, WWRB Manchester TN	9385va	12180va
1900	2000	USA, WYFR/Family Radio Worldwide		3230af
		6100af	9685af	9775af
		11865af	13615na	13690ca
			17845eu	18930va
				18980va
1900	2000	Zambia, CVC Intl/Christian Voice		4965af
		13590af		
1930	2000 fas	Germany, Pan American BC	9515af	
1930	2000	Iran, Voice of the Islamic Rep of Iran		6205eu
		7205eu	7260af	9800af
1936	2000 DRM	New Zealand, Radio NZ International		11675pa
1945	2000 DRM	Vatican City, Vatican Radio	9800na	
1950	2000	Vatican City, Vatican Radio	5885eu	7250eu
		9645eu		
1951	2000	New Zealand, Radio NZ International		11725pa

2000 UTC - 4PM EDT / 3PM CDT / 1PM PDT

2000	2015 Sun	Germany, Pan American BC	9515af	
2000	2019	Vatican City, Vatican Radio	5885eu	7250eu
		9645eu		
2000	2019 DRM	Vatican City, Vatican Radio	9800na	
2000	2027	Czech Rep, Radio Prague	5930eu	11600pa
2000	2027	Iran, Voice of the Islamic Rep of Iran		6205eu
		7205eu	7260af	9800af
				9925af
2000	2027	Vatican City, Vatican Radio	7365af	9755af
		11625af		
2000	2030 mtwhfa	Albania, Radio Tirana	7465eu	13600na
2000	2030	China, China Radio International		7160eu
2000	2030	Egypt, Radio Cairo	9300af	
2000	2030 fa	Germany, Pan American BC	9515af	
2000	2030	South Africa, AWR Africa	9655af	
2000	2030	USA, Voice of America	4930af	4940af
		6080af	15580af	17895af
2000	2045	Swaziland, Trans World Radio		3200af
2000	2045	USA, WYFR/Family Radio Worldwide		17750eu
2000	2050	New Zealand, Radio NZ International		11725pa
2000	2050 DRM	New Zealand, Radio NZ International		11675pa
2000	2057	China, China Radio International	5960eu	
		5985af	7190eu	7285eu
		9440va	9660eu	7295va
2000	2057	Germany, Deutsche Welle	6150af	11795af
		11865af	15205af	
2000	2057	Netherlands, R Netherlands Worldwide	5905af	
		7425af	17810af	
2000	2059	Canada, R Canada International		11765af
		13650af	15235af	17735af
2000	2059	Finland, Overcomer Ministries		6060eu
2000	2100	Anguilla, Worldwide Univ Network		11775am
2000	2100	Australia, ABC NT Alice Springs		2310do
		4835do		
2000	2100	Australia, ABC NT Katherine	2485do	
2000	2100	Australia, ABC NT Tennant Creek		2325do
2000	2100 Sat/Sun	Australia, Radio Australia	6080va	7240as
		12080as		
2000	2100	Australia, Radio Australia	9500va	11650as
		11660pa	11880as	
2000	2100	Belarus, Radio Minsk	7105eu	7360eu
		7390eu		
2000	2100	Canada, CFVP Calgary AB	6030na	
2000	2100	Canada, CKZN St John's NF	6160na	
2000	2100	Canada, CKZU Vancouver BC		6160na
2000	2100	Costa Rica, Worldwide Univ Network		13750va
2000	2100	Equatorial Guinea, Radio Africa		15190af
2000	2100	Germany, The Overcomer Ministries	5995eu	
		6175eu		
2000	2100	Kuwait, Radio Kuwait	11990va	
2000	2100 vl	Liberia, ELWA	4760do	
2000	2100	Malaysia, RTM/Traxx FM	7295as	
2000	2100	Netherlands, R Netherlands Worldwide	6020af	
2000	2100	Nigeria, Radio Nigeria/Kaduna	4770do	
2000	2100	Nigeria, Voice of Nigeria/Lagos	15120af	
2000	2100 vl	Papua New Guinea, R East New Britain	3385do	
2000	2100 vl	Papua New Guinea, Wantok R. Light	7325va	
2000	2100	Russia, Voice of Russia	7195eu	9890eu
2000	2100 vl	Rwanda, Radio Rwanda	6055do	
2000	2100	South Africa, Channel Africa	3345af	
2000	2100 mtwhf	Spain, Radio Exterior Espana	9665eu	11620af
2000	2100 vl	Uganda, UBC Radio	4976do	5026do
2000	2100	UK, BBC World Service	3255af	5875va
		6005af	6190af	9410af
			13820af	15400af
				17830af
2000	2100 DRM	UK, BBC World Service	5875eu	
2000	2100	USA, Armed Forces Radio Network	4319usb	
		5446usb	5765usb	6350usb
		10320usb	12133usb	13362usb
2000	2100	USA, WBCQ Monticello ME	7415am	9330am
		15420am		

2000 2100	USA, WBOH Newport NC	5920am	
2000 2100	USA, WEWN Vandiver AL	17595af	
2000 2100 mtwhf	USA, WHRA Greenbush ME	7520va	
2000 2100 Sat/Sun	USA, WHRA Greenbush ME	11885va	
2000 2100 f	USA, WHRI Cypress Creek SC	17650am	
2000 2100asmtwh	USA, WHRI Cypress Creek SC	9495am	
2000 2100	USA, WINB Red Lion PA	13570am	
2000 2100	USA, WRMI Miami FL	9955am	
2000 2100	USA, WTJC Newport NC	9370na	
2000 2100	USA, WWCR Nashville TN	9980na	12160na
	13845na	15825na	
2000 2100 Sun	USA, WWRB Manchester TN	11920af	
2000 2100	USA, WWRB Manchester TN	9385va	12180va
2000 2100	USA, WYFR/Family Radio Worldwide	7430eu	
	9485af	9625af	9635af
	13625af	17725sa	17795ca
	18910va		17845af
2000 2100	Zambia, CVC Intl/Christian Voice	4965af	
	13590af		
2005 2100	Syria, Radio Damascus	9330eu	
2030 2045	Thailand, Radio Thailand	9680eu	
2030 2056	Romania, R Romania International	9515eu	
	11940na	15465na	
2030 2058	Vietnam, Voice of Vietnam	7220va	7280va
	9550va	9730va	
2030 2100	Cuba, Radio Havana Cuba	9505va	11760va
2030 2100	Netherlands, R Netherlands Worldwide	7395af	
2030 2100	Sweden, Radio Sweden	7395va	
2030 2100	Turkey, Voice of Turkey	7170va	
2030 2100	USA, Voice of America	4930af	6080af
	7555as	15580af	17895af
2030 2100 Sat/Sun	USA, Voice of America	11720af	
2045 2100	India, All India Radio	7410eu	9445eu
	9910pa	9950eu	11620va
			11715pa
2051 2100	New Zealand, Radio NZ International	15720pa	
2051 2100 DRM	New Zealand, Radio NZ International	13730pa	

2100 UTC - 5PM EDT / 4PM CDT / 2PM PDT

2100 2125	Turkey, Voice of Turkey	7170pa	
2100 2127	China, China Radio International	11640af	
	13630af		
2100 2130	Australia, ABC NT Katherine	2485do	
2100 2130	Australia, ABC NT Tennant Creek	2325do	
2100 2130	Austria, Adventist World Radio Europe	11955af	
2100 2130 Sat	Canada, CBC NQ SW Service	9625na	
2100 2130	Cuba, Radio Havana Cuba	9505va	11760va
2100 2130	Nigeria, Radio, National Svc/Abuja	7275do	
2100 2130	South Africa, AWR Africa	11955af	
2100 2130	South Korea, KBS World Radio	3955eu	
2100 2145	USA, WYFR/Family Radio Worldwide	13615na	
	13690na	17795ca	18980va
2100 2157	China, China Radio International	5960eu	
	6135eu	7190eu	7285eu
	9600eu		
2100 2200	Angola, Radio Nacional de Angola	7217do	
2100 2200	Anguilla, Worldwide Univ Network	11775am	
2100 2200	Australia, ABC NT Alice Springs	2310do	
	4835do		
2100 2200	Australia, Radio Australia	9500as	9660as
	11650pa	11660pa	11695as
	13630as	15515as	12080as
2100 2200	Belarus, Radio Minsk	7105eu	7390eu
2100 2200	Bulgaria, Radio Bulgaria	5900eu	9700eu
2100 2200	Canada, CFVP Calgary AB	6030na	
2100 2200	Canada, CKZN St John's NF	6160na	
2100 2200	Canada, CKZU Vancouver BC	6160na	
2100 2200	Costa Rica, Worldwide Univ Network	13750va	
2100 2200	Equatorial Guinea, Radio Africa	15190af	
2100 2200	Germany, Deutsche Welle	9735af	11865af
	15205af		
2100 2200	Germany, The Overcomer Ministries	5995eu	
2100 2200	Guyana, Voice of Guyana	3291do	
2100 2200	India, All India Radio	7410eu	9445eu
	9950pa	11620eu	
2100 2200 vl	Liberia, ELWA	4760do	
2100 2200	Malaysia, RTM/Traxx FM	7295as	
2100 2200	New Zealand, Radio NZ International	15720pa	
2100 2200 DRM	New Zealand, Radio NZ International	13730pa	
2100 2200	Nigeria, Radio Nigeria/Kaduna	4770do	
2100 2200	Nigeria, Voice of Nigeria/Lagos	7255af	
2100 2200	North Korea, Voice of Korea	7560eu	13760eu
	15245eu		
2100 2200 vl	Papua New Guinea, Wantok R. Light	7325va	
2100 2200	South Africa, Channel Africa	3345af	
2100 2200 Sat/Sun	Spain, Radio Exterior Espana	9840eu	
2100 2200	Syria, Radio Damascus	9330eu	
2100 2200	UK, BBC World Service	3255af	3915as

	5875va	5905as	6005af	6190af
	6195as	7120af	15400af	
2100 2200 DRM	UK, BBC World Service	5875eu		
2100 2200	Ukraine, R Ukraine International		7510eu	
2100 2200	USA, Armed Forces Radio Network		4319usb	
	5446usb	5765usb	6350usb	7811usb
	10320usb	12133usb	13362usb	
2100 2200	USA, Voice of America	6080af	7555as	
	15580af			
2100 2200	USA, WBCQ Monticello ME	7415am	9330am	
	15420am			
2100 2200	USA, WBOH Newport NC	5920am		
2100 2200	USA, WEWN Vandiver AL	17595af		
2100 2200	USA, WHRA Greenbush ME	11885va		
2100 2200	USA, WHRI Cypress Creek SC		11785am	
	15665na			
2100 2200	USA, WINB Red Lion PA	13570am		
2100 2200	USA, WRMI Miami FL	9955am		
2100 2200	USA, WTJC Newport NC	9370na		
2100 2200	USA, WWCR Nashville TN	7465na	9980na	
	12160na	13845na		
2100 2200 Sun	USA, WWRB Manchester TN	11920af		
2100 2200	USA, WWRB Manchester TN	9385va	12180va	
2100 2200	USA, WYFR/Family Radio Worldwide	7430eu	3230af	
	11565eu	17845af		
2100 2200	Zambia, CVC Intl/Christian Voice	4965af		
2115 2200	Egypt, Radio Cairo	11550eu		
2130 2157	Czech Rep, Radio Prague	9410af	11600na	
2130 2200	Australia, ABC NT Katherine	5025do		
2130 2200	Australia, ABC NT Tennant Creek		4910do	
2130 2200 mtwhfa	Canada, CBC NQ SW Service	9625na		
2130 2200	Guam, KSDA/ Adventist World Radio		11850as	
2130 2200	Lithuania, Mighty KBC Radio	6055eu		
2130 2200	Netherlands, R Netherlands Worldwide	7420pa		
2130 2200	Sweden, Radio Sweden	6065va	7420pa	

2200 UTC - 6PM EDT / 5PM CDT / 3PM PDT

2200 2210	Syria, Radio Damascus	9330eu	
2200 2220	Japan, NHK World/Radio Japan		13640as
2200 2229	Lithuania, Mighty KBC Radio	6055eu	
2200 2230	India, All India Radio	9910pa	11620pa
	11715pa		
2200 2235	New Zealand, Radio NZ International	15720pa	
2200 2245	Egypt, Radio Cairo	11550eu	
2200 2245	USA, WYFR/Family Radio Worldwide		15770af
2200 2255	Turkey, Voice of Turkey	6195va	
2200 2256	Romania, R Romania International	7185eu	
	9675eu	9790na	
2200 2257	China, China Radio International	7175eu	
2200 2300	Anguilla, Worldwide Univ Network	6090am	
2200 2300	Australia, ABC NT Alice Springs	2310do	
	4835do		
2200 2300	Australia, ABC NT Katherine	5025do	
2200 2300	Australia, ABC NT Tennant Creek		4910do
2200 2300	Australia, Radio Australia	11840va	12010va
	13630pa	15230va	15515as
	17785pa		
2200 2300 smtwhf	Canada, CBC NQ SW Service	9625na	
2200 2300	Canada, CFVP Calgary AB	6030na	
2200 2300	Canada, CKZN St John's NF	6160na	
2200 2300	Canada, CKZU Vancouver BC		6160na
2200 2300	China, China Radio International		9590as
2200 2300	Costa Rica, Worldwide Univ Network		13750va
2200 2300	Equatorial Guinea, Radio Africa		15190af
2200 2300 vl	Guyana, Voice of Guyana	3291do	
2200 2300	Liberia, ELWA	4760do	
2200 2300	Malaysia, RTM/Traxx FM	7295as	
2200 2300 DRM	New Zealand, Radio NZ International		13730pa
2200 2300	Nigeria, Radio Nigeria/Kaduna		4770do
2200 2300	Nigeria, Voice of Nigeria/Lagos		7255af
2200 2300 vl	Papua New Guinea, Wantok R. Light		7325va
2200 2300	Taiwan, R Taiwan International		9355eu
2200 2300	UK, BBC World Service	5905as	5975as
	6005af	6195as	9740as
	15400af		12095af
2200 2300	USA, Armed Forces Radio Network		4319usb
	5446usb	5765usb	6350usb
	10320usb	12133usb	13362usb
2200 2300	USA, Voice of America	5895va	5915va
	7120va	7460as	7555va
	11725va	15185va	9415va
2200 2300	USA, WBCQ Monticello ME	7415am	9330am
2200 2300	USA, WBOH Newport NC	5920am	
2200 2300	USA, WEWN Vandiver AL	15665af	
2200 2300	USA, WHRA Greenbush ME	11885va	
2200 2300	USA, WHRI Cypress Creek SC		7385na
	9615na	11785am	

2200	2300	USA, WINB Red Lion PA	9265am	
2200	2300	USA, WRMI Miami FL	9955am	
2200	2300	USA, WTJC Newport NC	9370na	
2200	2300	USA, WWCN Nashville TN	5070na	7465na
		9980na	13845na	
2200	2300	USA, WWRB Manchester TN	5050na	6890va
		9385va	12180va	
2200	2300	USA, WYFR/Family Radio Worldwide	5950na	
		11740na	15440na	
2200	2300	Zambia, CVC Intl/Christian Voice	4965af	
2230	2257	Czech Rep, Radio Prague	7345na	9415na
2230	2300	Guam, KSDA/ Adventist World Radio	15320as	
2230	2300	DRM Sweden, Voice of Sweden	9800na	
2230	2300	USA, Voice of America	9570va	11705va
		15145va		
2236	2300	New Zealand, Radio NZ International	15720pa	
2245	2300	India, All India Radio	9705eu	9950as
		11620as	11645as	13605as

2300 UTC - 7PM EDT / 6PM CDT / 4PM PDT

2300	0000	Anguilla, Worldwide Univ Network	6090am	
2300	0000	Australia, ABC NT Alice Springs	2310do	
		4835do		
2300	0000	Australia, ABC NT Katherine	5025do	
2300	0000	Australia, ABC NT Tennant Creek	4910do	
2300	0000	Australia, Radio Australia	9660as	11840va
		12010pa	12080pa	13690pa
		15240pa	15560va	17785pa
2300	0000	Bulgaria, Radio Bulgaria	9700na	11700na
2300	0000	Canada, CBC NQ SW Service	9625na	
2300	0000	Canada, CFVP Calgary AB	6030na	
2300	0000	Canada, CKZN St John's NF	6160na	
2300	0000	Canada, CKZU Vancouver BC	6160na	
2300	0000	China, China Radio International	5915as	
		5990am	6145na	7180as
		11690as	11970ca	9460as
2300	0000	DRM China, China Radio International	9800ca	
2300	0000	Costa Rica, Worldwide Univ Network	13750va	
2300	0000	Cuba, Radio Havana Cuba	9505am	9550am
2300	0000	Egypt, Radio Cairo	9280na	
2300	0000	Guyana, Voice of Guyana	3291do	
2300	0000	India, All India Radio	9950as	11645as
		13605as		
2300	0000	Malaysia, RTM/Traxx FM	7295as	
2300	0000	DRM New Zealand, Radio NZ International	13730pa	
2300	0000	New Zealand, Radio NZ International	15720pa	
2300	0000	vi Papua New Guinea, Wantok R. Light	7325va	
2300	0000	UK, BBC World Service	3915as	5965as
		6195as	9740as	9885as
		12010as		11850as
2300	0000	USA, Armed Forces Radio Network	4319usb	
		5446usb	5765usb	6350usb
		10320usb	12133usb	13362usb
2300	0000	USA, Voice of America	5895va	5915va
		7120as	7555as	9415va
		11725va	13755va	15145va
				15185va
2300	0000	USA, WBCQ Monticello ME	7415am	9330am
2300	0000	USA, WBOH Newport NC	5920am	
2300	0000	USA, WEWN Vandiver AL	15665af	
2300	0000	USA, WHRA Greenbush ME	5850eu	
2300	0000	USA, WHRI Cypress Creek SC	7315na	
		9615na	11785am	
2300	0000	mtwhfa USA, WHRI Cypress Creek SC	11785na	
2300	0000	USA, WHRI Cypress Creek SC	7315am	
2300	0000	USA, WRMI Miami FL	9955am	
2300	0000	USA, WTJC Newport NC	9370na	
2300	0000	USA, WWCN Nashville TN	5070na	7465na
		9980na	13845na	
2300	0000	USA, WWRB Manchester TN	5050na	6890va
		9385va	12180va	
2300	0000	USA, WYFR/Family Radio Worldwide	5950na	
		15255sa	15440sa	17750sa
2300	0000	Zambia, CVC Intl/Christian Voice	4965af	
2300	2305	vi Liberia, ELWA	4760do	
2300	2315	Nigeria, Radio Nigeria/Kaduna	4770do	
2300	2327	Vatican City, Vatican Radio	9600va	12035va
2300	2330	Australia, Radio Australia	15240pa	
2300	2345	USA, WYFR/Family Radio Worldwide	11740na	
2305	0000	Canada, R Canada International	6100na	
2305	0000	Greece, Voice of Greece	7475eu	9420eu
2315	2330	vi Croatia, Croatian Radio	9925na	
2330	0000	Australia, Radio Australia	15415as	17750va
2330	0000	Lithuania, Radio Vilnius	9875na	
2330	0000	UK, BBC World Service	9580as	
2330	0000	USA, Voice of America	7350va	9570va
		13755va	15145va	15340va
2330	2358	Vietnam, Voice of Vietnam	9840as	12020as

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Albania, Radio Tirana	http://rtsh.sil.at/
Angola, Radio Nacional de Angola	www.rna.ao/
Anguilla, Worldwide Univ Network	www.worldwideuniversitynetwork.com/
Argentina, RAE	www.radiacionacional.gov.ar/rae/rae.asp
Australia, ABC NT Alice Springs	www.abc.net.au/radio/
Australia, ABC NT Katherine	www.abc.net.au/radio/
Australia, ABC NT Tennant Creek	www.abc.net.au/radio/
Australia, CVC International	www.christianvision.com/
Australia, HCJB Global	www.hqjb.org/
Australia, Radio Australia	www.abc.net.au/ra/
Austria, AWR Europe	www.awr2.org/
Austria, Radio Austria Intl	http://oe1.orf.at/service/international
Bahrain, Radio Bahrain	www.radiobahrain.net/
Bangladesh, Bangla Betar	www.betar.org.bd/
Belarus, Radio	www.radiobelarus.tvr.by/eng/
Bhutan, BBS	www.bbs.com.bt/
Bulgaria, Radio	www.bnr.bg/
Canada, CBC NQ SW Service	www.cbc.ca/north/
Canada, Radio Canada Intl	www.rcinet.ca/
China, China Radio Intl	www.cri.cn/
Costa Rica, Worldwide Univ Network	www.worldwideuniversitynetwork.com/
Croatia, Croatian Radio	www.hrt.hr/
Cuba, Radio Havana	www.radiohc.cu/
Czech Rep, Radio Prague	www.radio.cz/en/
Finland, Overcomer Ministries	www.overcomerministries.org
France, Radio France Intl	http://rfenglish.com
Germany, AWR Europe	www.awr2.org/
Germany, CVC Intl/Voice Africa	www.christianvision.com/
Germany, Deutsche Welle	www.dw-world.de/
Germany, Overcomer Ministries	www.overcomerministry.org/
Germany, Pan American BC	www.radiopanam.com/
Germany, The Overcomer Ministries	www.overcomerministry.org/
Germany, TWR Europe	www.twr.org/
Greece, Voice of Greece	www.voiceofgreece.gr/
Guam, AWR/KSDA	www.awr2.org/
Guam, TWR/KTWR	www.twr.org/
Guyana, Voice of	http://voiceofguyana.com/
India, All India Radio	www.allindiaradio.org/
Indonesia, Voice of Indonesia	www.vri-online.com/
Iran, Voice of the Islamic Rep of Iran	www2.irib.ir/worldservice/
Japan, NHK World/Radio Japan	www.nhk.or.jp/english/
Jordan, Radio	www.rtv.jo/rj/index.php
Latvia, Radio SWH	www.radioswh.lv/index.php
Liberia, ELWA	www.elwaministries.org/
Liberia, Star Radio	www.radioswh.lv/index.php
Libya, Voice of Africa	www.ljbc.net/home.php
Lithuania, Radio Vilnius	www.lrt.lt/
Malaysia, RTM/Traxx FM	www.traxx.net/index.htm
Malaysia, RTM/Voice of Malaysia	http://202.190.233.9/vom/utama.htm
Monaco, TWR Europe	www.twr.org/
Nepal, Radio	www.radionepal.org/
Nepal, Radio	www.radionepal.org/
Netherlands, Radio Netherlands	www.radionetherlands.nl/
New Zealand, Radio NZ Intl	www.rnzzi.com
Nigeria, Radio, Natl Svc/Abuja	http://radionigeriaonline.com
Nigeria, Radio/Kaduna	http://radionigeriaonline.com
Nigeria, Voice of/ Ext. Svc Lagos	www.voiceofnigeria.org
Oman, Radio Oman	www.oman-tv.gov.om
Pakistan, Radio	www.radio.gov.pk
Papua New Guinea, NBC	www.nbc.com.pg/
Papua New Guinea, Wantok R. Light	http://wantokradio.net/
Philippines, Radio Pilipinas	www.radiopilipinas.com/
Poland, Polish Radio	www.polskieradio.pl/zagranica/gb/
Romania, Radio Romania Intl	www.rri.ro/
Russia, Voice of Russia	www.vor.ru/world.html
Saudi Arabia, BSKSA	www.saudiradio.net/
Singapore, MediaCorp Radio	www.mediacorpradio.sg
Singapore, Radio Singapore Intl	www.rsi.sg
Slovakia, Radio Slovakia Int	www.rsi.sk
Solomon Islands, SIBC	www.sibonline.com.sb/
South Africa, AWR Africa	www.awr2.org/
South Africa, Channel Africa	www.channelafrica.org
South Africa, Trans World Radio	www.twr.org/
South Korea, KBS World Radio	http://rki.kbs.co.kr/english/
Spain, Radio Exterior Espana	www.ree.rne.es/
Sri Lanka, SLBC	www.slbc.lk
Swaziland, Trans World Radio	www.twr.org/
Sweden, Radio	www.sr.se/rs/english/
Syria, Radio Damascus	www.rtv.gov.sy/
Taiwan, Radio Taiwan Intl	http://english.rti.org.tw/
Thailand, Radio	www.hsk9.com/
Turkey, Voice of	www.trt.net.tr
UK, BBC World Service	www.bbc.co.uk/worldservice/
UK, Bible Voice BC	www.biblevoice.org/
UK, FEBA	www.feba.org.uk
UK, Sudan Radio Service	www.sudanradio.org/
Ukraine, Radio Ukraine Intl	www.nrcu.gov.ua/
USA, American Forces Radio	http://myafn.dodmedia.osd.mil/
USA, KNLS Anchor Point AK	www.knls.org/
USA, KTNB Salt Lake City UT	www.ktnb.org/
USA, KWHR Naalehu HI	www.whr.org/
USA, Voice of America	www.voanews.com/
USA, WBCQ Monticello ME	www.wbcq.com/
USA, WBOH Newport NC	www.fbnradio.com/
USA, WEWN Vandiver AL	www.ewtn.com
USA, WHRA Greenbush ME	www.whr.org/
USA, WHRI Cypress Creek SC	www.whr.org/
USA, WINB Red Lion PA	www.winb.com/
USA, WMLK Bethel PA	www.wmlkradio.net
USA, WRMI Miami FL	www.wrmi.net/
USA, WTJC Newport NC	www.fbnradio.com/
USA, WWCN Nashville TN	www.wvcr.com
USA, WWRB Manchester TN	www.wvrb.org/
USA, WYFR/Family Radio Worldwide	www.worldwide.familyradio.org
Uzbekistan, CVC International	www.christianvision.com/
Vatican City, Vatican Radio	www.vaticanradio.org
Vietnam, Voice of Vietnam	www.vov.org.vn
Yemen, Rep of Yemen Radio	www.yemenradio.net
Zambia, CVC Intl/Christian Voice	www.christianvision.com/

The X-Files Radio Net

**XAX XBX XCV XDV XEJ XFY XGV
XGZ XHZ XJV XKY XLG XOP XPK
XSS**

No, you aren't looking at encrypted information from the personal day planners of Mulder or Scully, but a partial list of ALE addresses. These addresses have been heard recently on one of the more bizarre military HF military nets in operation today – the United Kingdom Ministry of Defense, Defense High Frequency Communications Service (DHFCS) Terrestrial Air Sea Communications (TASCOMM) network. Most active HF utility enthusiasts will recognize this net by its hobby nickname – the XSS net.

The DHFCS provides long distance strategic communication between UK military services and the Ministry of Defense headquarters using HF communications. Awarded as a GBP220 million 15-year Private/Public Partnership to prime contractor VT Communications in 2003, it has subsumed the following legacy systems:

- Strike Command Integrated Communications System (STCICS), now known as Terrestrial Air Sea Communications (TASCOMM)
- Maritime ALE/ARQ data services (broadcasts and ship/shore/ship communications)
- NATO HF Broadcast and Ship Shore (BRASS) service provided by the Royal Air Force and Defense Communications Service Agency (DCSA).

The system is based at six sites in the United Kingdom and four overseas. In the UK they are Crimond, Inskip, Kinloss, Forest Moor, Penhale Sands, and St Eval. Cyprus, Gibraltar, Ascension Island and the Falklands Islands comprise the overseas sites.

The Network Control Station (NCS) at Forest Moor in Yorkshire controls all DHFCS assets worldwide. It is widely believed that the XSS ALE address is associated with Forest Moor. The alternative network control center (ANCS) is located at RAF Kinloss in Scotland. A number of sites used in older legacy systems that have been replaced by TASCOMM (Bampton Castle, Milltown, St. Mawgan, Chelveston, Fort Staddon, Clach McKenny, Toward Taynuilt, Yeovilton, Plymouth and Culdrose) were closed by October 2006.

Both the NCS and ANCS will control, transmit, and receive assets around the world to provide an efficient and responsive service to the users. Combined with the introduction of new RAF and RN platform HF communications equipment supplied under separate contracts, DHFCS will take full advantage of the modern high-speed waveforms to provide rapid data throughput, eventually including HF email. Automatic Link Establishment (ALE), Automatic

Repeat Request (ARQ), and Automatic Link Management (ALM) techniques will be used to simplify and speed up the process of establishing HF communication channels.

The new infrastructure includes new transmitters, receivers, antennas and an integrated control system. The principal sub-contractor is Rockwell-Collins, who have provided a system based on the US Scope Command. The new system provides both voice and data services.

Under DHFCS, Terrestrial Air Sea Communications (TASCOMM) is available for use by the Royal Navy, Royal Air Force and the Army. TASCOMM is a ground-air-ground, ship-shore and ground-to-ground HF radio communications service designed for NATO and National use.

So where can you hear this exotic military HF network? The following frequencies have been reported in the last two years (mode=ALE/USB):

ALE Frequencies:

2216.0 (ex-2217.4) 2240.0 2431.0 2705.0
2784.0 2794.0 3226.0 (ex-3227.4) 3236.5
3260.0 3503.5 4168.5 (ex-4166.3) 4239.5
(ex-4226.5) 4372.0 4706.0 4732.0 5268.5
5270.0 5295.0 5708.0 6251.0 (ex-6243.0)
6416.5 (ex-6425.0) 6691.0 6706.0 6865.0
6873.5 6898.0 7535.0 7635.0 7641.5
8035.0 8107.0 (ex-8108.5) 8165.5 8182.0
(ex-8126.4) 8192.0 8532.5 8809.0
8980.0 9019.0 (ex-9016.0) 9031.0 9265.0
10225.0 10233.5 10344.5 (ex-10360.0)
10351.0 10575.0 10893.5 11217.0
11292.0 11514.0 12230.0 (ex-12333.0)
12736.0 13215.0 14455.0 14485.5
14508.5 (ex- 14510.0) 14665.0 14818.5
14855.0 16350.0 16402.0 16411.0
16606.0 (ex-16553.5) 18403.5 18509.0
18840.0 19427.0 20168.5 20328.5 kHz

ALE Addresses - Unidentified:

XAP XAS XAX XBC XBE XBX XCA XCV XDB
XDV XEJ XFT XFW XFY XGF XGG XGJ XGP
XGZ XHJ XHK XHN XHR XHZ XIM XJF
XJK XJP XJT XJV XKA XKB XKK XKP XKW
XKY XLG XOP XPK XSA XSB X951Q1

ALE Addresses - Identified:

200201 C-17A 99 Squadron RAF Brize
Norton #Z171: Selcal JK-ES
200202 C-17A 99 Squadron RAF Brize
Norton #Z172: 00-0202/N172UK
200203 C-17A 99 Squadron RAF Brize
Norton #Z173: Selcal KP-DF
200204 C-17A 99 Squadron RAF Brize
Norton #Z174: 00-0204/N174UK
UKE301 Sentry AEW-1 8 Sqn/23 Sqn RAF
Waddington #ZH101
UKE302 Sentry AEW-1 8 Sqn/23 Sqn RAF
Waddington #ZH102
UKE303 Sentry AEW-1 8 Sqn/23 Sqn RAF
Waddington #ZH103

UKE304 Sentry AEW-1 8 Sqn/23 Sqn RAF
Waddington #ZH104
UKE305 Sentry AEW-1 8 Sqn/23 Sqn RAF
Waddington #ZH105
UKE306 Sentry AEW-1 8 Sqn/23 Sqn RAF
Waddington #ZH106
UKE307 Sentry AEW-1 8 Sqn/23 Sqn RAF
Waddington #ZH107

The following ALE addresses have been observed transmitting using a Mil-Std-188-100 serial modem 75bps+600bps/Short Interval: XGV XKD XLE

It has been reported that the NCS station (ALE Address XSS) is transmitting from transmitter sites at Forest Moor and St. Eval.

Another official publication listed the following information regarding the TASCOMM network:

United Kingdom (TASCOMM)

Voice Call Sign: ARCHITECT

Frequency: 4742.0 5702.0 9031.0 11247.0 13257.0 18018.0 kHz

Note: Long range HF Flight Watch communications for RAF/Naval aircraft from 24 hour manned operations center at DHFCS Forest Moor and DHFCS Kinloss.

Ascension

Voice Call Sign: HAVEN

Frequency: 4742.0 9031.0 11247.0 kHz
Note: Flight Watch available for notified flights.

Cyprus

Voice Call Sign: CYPRUS

Frequency: Channel 1 - 4742.0 (a), Channel 2 - 9031.0, Channel 3 - 11247.0

Note: (a) H+15 weather broadcasts, when active.

Mount Pleasant (MPA)

Voice Call Sign: VIPER

Frequency: 4742.0 (a) 11247.0 (a)

Note: (a) H+35 weather broadcasts when active.

There is still a lot to learn about the XSS net, and if you have anything you would like to add, please contact me at the email address in the masthead. To use a phrase from my favorite 90s SciFi show – “The Truth is Out There.”

❖ Monitoring the Royal Navy

A friend of mine that I regularly communicate with via email passed along the following frequencies for RN Yeovilton, which is located in Somerset county in southwest England.

Radar 314.375 264.700 259.075 234.300 123.300 127.350
 Approach 234.300/127.350
 Director 259.075/123.300
 Talkdown 282.025/123 300 241 525
 Tower 375.575/120.800
 Ground 268.625/122.100
 ATIS 283.925
 Yeovil Ops 3942.0 kHz

Thanks, John, for sharing this with our *MT* readers.

❖ Georgia (the country) Invaded

As this column goes to press, military forces from Russia have invaded the former Soviet Republic of Georgia. A cease fire has been negotiated and signed by both parties and tensions have eased, but most observers agree that things could escalate at any time. So, if you are an active HF utility monitor, you might want to keep an eye on the timely frequency list below for possible future activity.

GEORGIA MILITARY

5GS HF ALE Network

ALE-5GS BR2 PMR SBR SKB VBR

3541.0 3652.0 3723.0 3824.0 4555.0 4605.0 4605.0 4721.0 5131.0
 5321.0 5415.0 5572.0 5672.0 5762.0 6341.0 6451.0 6523.0
 7033.0 7415.0 kHz

8GS HF ALE Network

ALE-1GS 8GS 1BR 2BR 3BR KB1 KBT MHE

3565.0 3645.0 3745.0 3855.0 4535.0 4545.0 4625.0 4645.0 4735.0
 5235.0 5320.0 5351.0 5425.0 5780.0 6351.0 6551.0 6583.0
 7425.0 7545.0 7045.0 kHz

ART-SE2 HF ALE Network

ALE-ART SE2

5103.0 5203.0 6203.0 kHz

BR1 HF ALE Network

ALE-BR1 BR2 BR3 BT5 KG4

4015.0 4125.0 4500.0 4505.0 4550.0 4780.0 4970.0 5125.0 5290.0
 5330.0 5335.0 5400.0 5425.0 5430.0 5455.0 6650.0 6995.0
 7000.0 7125.0 7255.0 9125.0 kHz

GS1-MB1 HF ALE Network

ALE-GS1 MB1

3605.0 4075.0 4123.0 4235.0 5120.0 5235.0 5465.0 6210.0 6283.0
 6305.0 7555.0 7673.0 8123.0 8210.0 9137.0 9305.0 10173.0
 10273.0 10470.0 11110.0 11235.0 kHz

GS2 HF ALE Network

ALE-4L1 AIR AKH GS2 KD1 KSI NIK SAK TB1

3200.0 3400.0 3450.0 4100.0 4350.0 4550.0 4850.0 4851.7 4900.0
 5280.0 5350.0 5595.0 5650.0 6050.0 6250.0 6500.0 6750.0
 7650.0 7850.0 8450.0 8650.0 kHz

LAB HF ALE Network

ALE-LAB

4235.0 4505.0 4535.0 4550.0 6451.0 6551.0 kHz

LEN HF ALE Network

ALE-3BR 21B BF1 BG2 BR2 BT2 DZ1 GEI GS1 KBT LEN OMEGA1

3700.0 3755.0 3785.0 4015.0 4505.0 4780.0 4970.0 5200.0 5290.0
 5335.0 5430.0 5530.0 6255.0 6690.0 6695.0 6855.0 6950.0
 7500.0 7580.0 7705.0 7725.0 7780.0 8035.0 8080.0 kHz

Georgian Border Guard

ALE-101 204 244 288 334 340 360 501 536 541 550 555 571 720
 5555.0 6731.0 6800.0 6880.0 8083.0 8290.0 8413.0 8790.0 kHz

I would like to extend a special thanks to Thomas M. Rösner, DL8AAM, for the Georgia Army listings.

According to press reports, the Russian Black Fleet has played a major part in the Russian invasion of Georgia.

This fleet is headquartered out of Sevastopol, Ukraine (callsign RCV). According to Fritz Nusser's *Fascinating Shortwaves* website (www.astrosol.ch/) – RCV uses the collective callsigns RKZ, RLO, RIP90, RBE86 and others for its fleet or for a certain task force.

The major communications mode monitored from RCV is CW on the following frequencies:

4055.0 4755.0 5009.0 5224.0 5300.5 5312.0 5441.0 5775.0 5855.0
 6298.0 6325.0 6912.0 7422.0 7566.0 7568.0 8014.0 10201.0



Georgia tanks on maneuvers (Courtesy of the Georgia Ministry of Defense)

11688.0 12816.0 kHz

MPSK transmissions from RCV have also been monitored on 5312.0 kHz. CW message traffic on 10201.0 kHz has been monitored during the present conflict.

❖ US Navy Ship Decomm List

Josh Cox, a regular on the Milcom newsgroup list, recently posted a list of US Navy and USNS ships that are going to decommission over the next five years. We appreciate Josh sharing that information with the rest of the Milcom community.

2009

USNS Concord T-AFS 5

SINKEX

USNS Hayes TAG 195

SINKEX

USNS San Jose T-AFS 7

SINKEX

USNS Saturn T-AFS 10

SINKEX

USS Juneau LPD 10

Inactive Fleet

USS Kitty Hawk CV 63

Inactive Fleet

USS Nashville LPD 13

Inactive Fleet

USS Tarawa LHA 1

Inactive Fleet

2010

USNS Kilauea T-AE 26

SINKEX

USNS Mount Baker T-AE 34

SINKEX

USS Los Angeles SSN 688

Dismantle

USS McInerney FFG 8

Foreign Military Sales

USS Philadelphia SSN 690

Dismantle

2011

USNS Flint T-AE 32

SINKEX

USNS Kiska T-AE 35

SINKEX

USNS Shasta T-AE 33

SINKEX

USS Memphis SSN 691

Dismantle

2012

USS Boone FFG 28

Foreign Military Sales

USS Cleveland LPD 7

Inactive Fleet

USS Dubuque LPD 8

Inactive Fleet

USS John L Hall FFG 32

Foreign Military Sales

USS Stephen W Groves FFG 29

Foreign Military Sales

2013

USS Crommelin FFG 37

Foreign Military Sales

USS Doyle FFG 39

Foreign Military Sales

USS Denver LPD 9

Inactive Fleet

USS Enterprise CVN 65

Dismantle

USS Jarrett FFG 33

Foreign Military Sales

USS Klakring FFG 42

Foreign Military Sales

USS Underwood FFG 36

Foreign Military Sales

(And yes, SINKEX means what you think it does. According to www.sinkex.com: "Sinkex is the exercises conducted by the US Navy to practice gunnery, torpedo accuracy, and missile drills on decommissioned Naval Warships. It gives the US Navy the opportunity to practice on live targets, using real ammunition, and observing the results.")

And that does it for this month's *Milcom*. Until next month, 73 and good hunting.

Bandscan Potpourri

We have a bunch of news this month, no two pieces on the same subject! Let's start with news of five different 50,000-watt stations:

CINW-940 Montreal, Quebec:

This English-language news/talk station has flipped to oldies. For many years, this was the frequency for the CBC's English-language talk station.

WWWT-1500 Washington, D.C.:

For several years, news/talk WWWT's sister station WFED-1050 has carried a "Federal news" format – news and talk about the federal government for the many government employees in the capital. The government news format is moving to the more powerful 1500 frequency. No news yet about what happens to 1050.

KGA-1510 Spokane, Wash.:

Some of you may remember what happened to Fort Wayne, Indiana's WOWO-1190 ten years ago. The owners of a New York City station on the same frequency bought WOWO and reduced the nighttime power from 50,000 watts to 9,800, converting the station from Class A to Class B. This move eliminated interference protection for WOWO's skywave coverage area, and allowed the NYC station to begin nighttime operation.

It's happening again, this time in the West. The owners of suburban San Francisco station KPIG, also on 1510, have purchased KGA. KGA is converting from Class A to Class B and reducing nighttime power from 50,000 watts to 15,000. And once KPIG no longer has to protect KGA's skywave signal, the California station can increase nighttime power from 230 watts to 2,400.

WZFG-1100 Dilworth, Minnesota:

This station has flipped from sports to talk, "The Flag." The unusual thing about this station is its callsign. Of course, callsigns starting with "W" are for stations east of the Mississippi River. The river runs through Minnesota – so both "K" and "W" stations exist in the Land of 10,000 Lakes. But Dilworth is four miles due east of Fargo, North Dakota; almost as far west in Minnesota as you can get, and well over 100 miles west of the Mississippi.

One must assume that, as with the assignment of KTGG to a Michigan station, the FCC clerk who processed the WZFG call letter request didn't realize just where Dilworth is – didn't know that the station is on the wrong side of the river for a "W" callsign.

KYES-1180 Rockville, Minnesota:

In Central Minnesota, a new 50,000-watt station is planned in the St. Cloud area. (Unlike many newspaper articles along the lines of "local man plans new radio station," this station has an FCC permit and a good chance of actually going on the air...) KYES is being launched by longtime area broadcaster Andy Hilger and plans Catholic religious programming.

Now, on to some other items.

❖ **Moving Experiences**

You may remember a long-distance move approved last year, only to have the applicant drop the request. KELE-1360 in Missouri received permission to move to Ohio, but surrendered that permit and decided to stay in the Show-Me State.

Two more long-distance moves have been approved. One would have WGYV-1380 Greenville, Alabama, moving to Aurora, Indiana – and to 1030 kHz. Aurora is roughly 15 miles west of Cincinnati, Ohio, on the Ohio River.

The other involves KOTC-830 moving from Kennett, Missouri, to Memphis, Tennessee. No other technical changes (except the location of the tower) are proposed.

These long-distance moves are the only way to get a new daytime-only station into an area. FCC rules won't accept applications for stations that don't use at least 250 watts at night. But they don't say anything about preventing daytime-only stations from moving hundreds of miles and changing frequency.

❖ **Newbies**

A number of other completely new stations are listed this month. New station KJLL-540 is located about 20 miles east of Cheyenne near the Wyoming-Nebraska border. On this relatively clear frequency, it should make Wyoming easier (though still not easy) to log.

Maxwell Air Force Base, site of the new 1030 station in Alabama, is directly adjacent to the northeast side of Montgomery.

648 kHz (the old frequency of WVUV-720) and 1017 kHz (the frequency of one of the new Guam stations) are not typos. These stations are located outside International Telecommunications Union Zone II: in these areas, AM channels are 9 kHz wide instead of 10.

The 1017 kHz application on Guam contains an interesting phrase. When filing for a new station, the applicant must demonstrate they comply with regulations limiting how many

stations a single owner may control in a given market. Powell Meredith Communications, owner of the new station, answered this question this way:

"Neither Powell Meredith nor any individual or entity having an attributable interest in the applicant has an interest of any kind in any other station or application in the Agana, Guam market other than the pending AM application herein, **much less anything else in the Eastern Hemisphere.**"

It's not very often you see a clause like that!

❖ **Incompetence no Excuse**

In Battle Creek, Michigan, a station has gotten in trouble for unlicensed broadcasting. It wasn't exactly a pirate – they did once hold a license (it *was* WOLY-1500). But on October 1, 2004, that license expired. The station never filed for renewal.

In June 2006, the FCC sent them a letter warning their license was expired. In July, a FCC agent visited the station and found it operating on the expired license. And in August, agents personally informed the station's owner of the problem. The owner told the agents the station didn't renew its license because renewals must be filed electronically and the station doesn't have a computer.

In August 2007, they were still on the air, with a license that expired nearly three years before. The Commission sent a Notice of Apparent Liability for \$10,000. The station's response: we've filed a request for Special Temporary Authority to continue operating, and "...since that time, it has assumed that the request would be answered by the FCC."

As you might guess, the FCC didn't buy it. Yet, as recently as mid-July, this station was still on the air...

❖ **Mixed News**

Bjron Tryba advises of a major upgrade to the MWLIST website. This site lists worldwide AM transmitters – including a transmitter map which shows all transmitter sites at once on Google Earth! Give it a try on www.mwlist.org.

Watt Hairston has retired... The name may not be familiar to many DXers, but Watt was Chief Engineer of WSM-650. He shares the interest we all have in distant reception and most of us have in radio history. He's also an

AMERICAN BANDSCAN STATION REPORT

NEW:

New stations on the air
Pine Bluffs, Wyoming 540 KJL 900/700 DA-2

New station permits granted

Maxwell AFB, Alabama	1030	35,000/1,000 DA-2
Susanville, California	1490	1,000/970 ND
Agana, Guam	1017	4,000/4,000 ND
Agana, Guam	1170	250/250 ND
Blanchard, Louisiana	1550	1,000/500 DA-2
Whitefish, Montana	1450	420/420 ND
Bandon, Oregon	800	2,500/1,000 DA-2

New station applications denied/dismissed

Chugiak, Alaska	1160
Kenai, Alaska	980
Catalina, California	1450

New station applications reinstated

Englewood, Colorado	1550	50,000/1,000 DA-2
Golden, Colorado	1550	5,000/250 DA-N

These two applications are mutually exclusive – only one can be granted.

CHANGES:

Stations moved to new frequencies
Ellijay, Georgia 1580 WPGY from 1560; power from 1,000 watts to 500

Stations granted moves to new frequencies
Leone, American Samoa 720 WVUV from 648; power from 10,000/10,000 to 5,000/2,000

Stations requesting moves to new frequencies
Camrose, Alberta 840 CFCW from 790. No technical details available.

Stations granted moves to new cities
Aurora, Indiana 1030 WGYV from 1380KHz in Greenville, Alabama; 500 watts daytime-only, directional.
Memphis, Tennessee 830 KOTC from Kennett, Missouri. No technical changes.

Callsign changes

Alexander City, Alabama	1050	WBNM	from WRFS
Anniston, Alabama	1490	WSYA	from WANA
Irondale, Alabama	1480	WQOH	from WRLM
Seward, Alaska	950	KSEW	from KSWD
Palo Alto, California	1220	KDOW	from KNTS
Colorado Springs, Colo.	1300	KCSF	from KKML
Smithville, Georgia	1230	WUCN	(new station)
Elkhart, Indiana	1270	WCMR	from WFRN
New Albany, Indiana	1570	WMDA	from WWSZ
South Bend, Indiana	1620	WPNT	from WWLV
Georgetown, Kentucky	1580	WGVN	from WXRA
Stanford, Kentucky	1520	WKFO	from WRSL
Pocomoke City, Maryland	1070	WCRW	from WBEE
Austin, Minnesota	970	KQAG	from KNFX
Dilworth, Minnesota	1100	WZFG	from WZFN
Wilton, Minnesota	820	WBKK	(new station)
Brandon, Mississippi	970	WJFN	from WZQK
Neosho, Missouri	1420	KBTN	from KQYS
Newton, New Jersey	1360	WTOC	from WNNJ
Rochester, New York	990	WRCI	from WLGZ
Spring Lake, N. Carolina	1450	WFBX	from WCIE
Rosford, Ohio	1520	WNWT	from WDMN
Roseburg, Oregon	1490	KSKR	from KRNR
Johnstown, Pennsylvania	850	WNTJ	from WPRR
Walhalla, S. Carolina	1000	WJTP	from WWOE
Rockwood, Tennessee	580	WYHM	from WOFE
Manor, Texas	1120	KTXW	from KRAU
Seattle, Washington	1680	KNTS	from KDOW
Dunbar, West Virginia	1450	WLUX	(new station)

ND: non-directional
DA-N: directional at night only
DA-D: directional during daytime only
DA-2: directional all hours, two different patterns
DA-3: directional day, night and critical hours, three different patterns

outspoken opponent of HD Radio, and a founding member of the StopIBOC.com website.

❖ Reader comments

Howard Box of East Tennessee wrote, mostly concerned with digital TV. Howard lives in Oak Ridge, about 20 miles from Sharp's Ridge in Knoxville, where the TV towers are. Using a medium-sized all-channel antenna two floors up, he gets good signals from six Knoxville stations.

Except that they all break up... Intermittently, the audio stutters and the picture freezes. Or, "From time to time it looks like tiny ice cubes are on part or much of the screen." (In the industry, we call this "macro blocking." In digital TV, a very fuzzy picture is transmitted first; then, the details are filled in. If the details are lost... you get what Howard mentions seeing.)

The PBS station in Knoxville recently suffered a tube failure in their old analog transmitter. TV transmitter tubes are VERY expensive; with analog going off the air next February, WKOP-TV decided repairing the analog transmitter wasn't worth it. Howard receives WKOP's digital transmission, but the audio stutters are so annoying he prefers to watch a weak signal from WKOP's analog relay transmitter in Sneedville, far to the east of Oak Ridge.



Many TV stations have a dome like this either at their studio or on their tower. This one, at WBIR-TV in Knoxville, houses the station's weather radar antenna.

Readers elsewhere should note: analog stations are dropping like flies. WKOP is hardly the only station to decide expensive failures to analog transmitters are not worth repairing.

Dennis Rodman is the latest DXer to report the time signal on 570 kHz. (He lives in New Jersey so I assume Dennis isn't the ex-Bulls basketball player...) Both Dennis and a colleague in Toms River are hearing one-second time ticks and "RR" in Morse Code. This station is from Cuba; the "RR" stands for Radio Reloj, literally "Clock Radio." That's really just a slogan; the clock ticks are for effect, much like the teletype sounds you used to hear during newscasts on U.S. stations. Radio Reloj is an all-news outlet which far predates the Cuban Revolution.

❖ 'Til next month

Just when you thought you'd heard every station you could possibly hear, someone builds a new station or moves an existing station to a new frequency... What's the newest station you've logged? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

URLS IN THIS MONTH'S COLUMN

My AM DX blog

<http://americanbandscan.blogspot.com>

St. Cloud Times article on new 50kw KYES-1180

www.sctimes.com/apps/pbcs.dll/article?AID=2008107120037

FCC document on Michigan station operating with an expired license...

http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-08-1647A1.txt

MWLIST, a Europe-based list of worldwide AM stations

www.mwlist.org

A coalition of AM broadcasters opposed to IBOC digital radio

www.stopiboc.com

Tubes, Travels and Telecommunications

Seaway Beauharnois, Seaway Beauharnois, Here is the Canadian Empress!

Canadian Empress, Seaway Beauharnois, go ahead!

Seaway Beauharnois, the Canadian Empress, we are preparing to get underway and want to know the traffic in the Seaway.

Roger. The Isa is just departing St. Lambert lock, the Federal Patroller is just approaching the lock and the Algowood is just below Valleyfield Bridge. If you can fit in between the Federal Patroller and the Algowood we can fit you into a turn back for the lock.

This message on channel 12 started the *Canadian Empress* rolling on our journey up the St. Lawrence Seaway from Montreal to Upper Canada Village. At 0500 this information put us first in the upbound cue for the locks and we didn't waste any time.

As the deckhand, Kelly Denis, and I singled up the lines, engineer Reg Wonham checked the engines and started them. Captain Brian Johnson set up the bridge equipment, and in less than 15 minutes we had let go the lines to be on our way out of Montreal Harbour. A quick check with Montreal Traffic Control, on channel 10, cleared us to enter the Seaway at check-in point 2.

This quick maneuver got us first in line and we had no upbound traffic to follow through the entire system. We were lucky because the *CCGC Tracy* was moored near us and she left about 15 minutes after us and had to follow us through the locks. Although we had AIS (Automatic Information System) aboard and saw the traffic, the radio call gave us the turns at the lock and saved us several hours' time that day – another example of how helpful marine radio can be.

I have made several voyages on the *Canadian Empress* as mate this year. Running 11 or 12 days at a time has sometimes been arduous, but I have had some interesting experiences. Besides being able to see AIS and Marine Radio in action, I got some great marine photographs for my collection. However, the days are long and there is a lot of work to be done.

I have voyaged between Kingston and Montreal twice, Kingston and Quebec City four

times, and Kingston to Ottawa, via the Ottawa River, four times. I have visited a number of world ports, but Quebec City from the water is still my favorite sight! It has been quite an interesting season to probably wind up my sailing career.

Unfortunately, the activity has severely cut into my radio operating time and little HF work was done this summer. I just worked LZ5FF on 40m CW and that is my first contact since June 7.

The VHF marine radio is always busy as we monitor channel 16 for emergencies and the seaway traffic control channels. As you proceed downriver from Kingston, you work Seaway Clayton on channel 12, Seaway Iroquois on channel 11, and Seaway Beauharnois on channel 14.

The locks themselves alternate between channels 13 and 17 for direct communications with the lock crew. The Iroquois, Snell, Lower Beauharnois, and St. Lambert locks are all on channel 17, while the Eisenhower, Upper Beauharnois, and Cote Ste. Catherine locks are on channel 13.

Once you reach Montreal, traffic control switches to channel 10 for the harbor area. As you travel east of Montreal, you change to Quebec Traffic Control on channel 13 at Tracy, and then to channel 12 as you near Quebec City. On the Ottawa River, the locks at Ste. Anne de Bellevue and Carillon monitor channel 68. The Parc

Lescale Marina in Montreal monitors channel 68 while the Louis Basin in Quebec City monitors channel 71. All Canadian marinas in this area monitor channel 68. The only actual private coast station in this area is the Gananoque Boat Lines. They use channel 7A for their internal communications.

As you read this in October, there will be lots of traffic on the Seaway, and there are numerous check-in points where you are required to contact the appropriate control station. Using these channels you will hear the traffic and any incidents on the Seaway. For instance, we were lucky on the downbound trip; we had just gotten through the Snell lock, and then they had a problem. Shipping was suspended for 12 hours, and we would have been caught between two locks for all that time, with nowhere for the passengers to go.

I have used my amateur VHF/UHF handheld from the ship and made several interesting contacts, including some IRLP (internet relay link protocol) contacts back to Kingston.

❖ Cruising (Busman's Holiday?)

My other travels this year were on the *MV Norwegian Sun*. My wife and I took a repositioning cruise from Miami to Honduras, Costa Rica, Colombia, the Panama Canal, Mexico, and then to San Francisco, Victoria, and Vancouver.



I never thought I would be there in my life and we thoroughly enjoyed the voyage. It is much easier to be a passenger than a crew member, believe me!

Of course, my Sangean portable receiver, Icom T90A amateur transceiver, and small marine handheld went along for the trip. I did some HF listening with a roll-up wire antenna from my balcony, and also with the whip antenna on the stern deck. I did some impromptu radio seminars on the stern deck with the crew, as they wanted to know about short wave radio and what I could hear.

Several of us listened to Radio Australia on 17 MHz and that caused some of them to want to buy a radio right away. I was impressed by the signal strength of CHU, Ottawa, time signal, on all frequencies. I could hear them on 3330 sometimes, but 7335 was quite strong in the Caribbean. 14,670 was heard in the Caribbean and the entire Pacific area. Of course, WWV was heard as well.

I copied CAMSLANT Chesapeake and CAMSPAC Point Reyes on 5696 and 8983 SSB several times. The VHF radio for traffic control was also very interesting here. You could hear the various control stations giving clearances, ETAs, etc.

I also monitored their internal 450 MHz frequencies and heard what was up aboard ship. These can be quite interesting and informative. You can get internal frequencies on several web sites using Google, or just scan the 450 to 470 MHz band on ship. 457.575 seems to be a common frequency for this line.

As you go up the American and Canadian west coast, various weather radios come into range. They use the NOAA / Environment Canada weather frequencies. You can also hear the Canadian marine weather channels 21B and 83 B. I will give a list of what I heard at the end of the column.

❖ Amateur Radio

I would be remiss not to mention the fine amateur radio VHF repeater system in southern British Columbia. I could access the repeater many miles from Victoria. Jim, VE7GOF contacted me and told me to call him for the IRLP codes. Apparently they had been having some unlicensed people playing with the system. But it's no problem for an amateur to get the codes from him. Then as VE3GO/VE7 marine, I contacted my friend George VE3GHK, in Kingston, via IRLP link.

❖ AIS

The AIS receiver installed in my radio shack by Louis Tellier is working well. I was also given the program *Shipplotter* which shows the AIS material on my computer. I am getting reception from approximately a 30 mile radius of my location. This depends on the ship's antenna height and the islands in between the ship and my location.

The AIS on the ship was not getting much range when I first went aboard. A look at the settings showed it was on the internal antenna, and when the external antenna was selected the range increased dramatically. This system gives



you a range and bearing to the ship, its course and speed, destination, dimensions, etc. It is very enjoyable to follow. For a ship watcher like me, the information is very useful. Announcements for the passengers could be made more informative from the AIS data.

❖ Tubes

I have to thank *Monitoring Times* for reviving my interest in vintage radios. On a trip to the Kitchener, Ontario, area, my wife and I visited an large antique barn in Cambridge. As usual, I was looking for a few things she likes. I came to one stand and there was a collection of old radios.

Most of them were AM radios, but back in the corner I spied an original Hallicrafters S-38. It was an original with the CW tune control and it was in great shape. All the knobs were original and the case showed little wear. The insides were clean and there had been no modifications. When I plugged it in, it worked and the BFO worked as well.

I had one of these given to me in the early

1960s when I was about 15 years old. Needless to say, it is now proudly sitting in my radio shack and has been tried out. I plan to replace the back fiberboard cover and some capacitors. A long wire is in the works and a good ground. Many years disappeared as I listened to this old radio. Once a short wave radio enthusiast, you are always one. I even got my old *Popular Electronics* SWL certificate out, VE3PE1BQ, and mounted it in the shack.

As my TS570S feeds a digital signal into my computer and the program Multipsk decodes the Navtex broadcast, the change in communications in the last 50 years becomes very evident. In fact, next year is the 50th anniversary of my first listening to shortwave radio and my first QSL card from Radio Budapest Hungary.

Now that my sailing has come to an end for the season and perhaps permanently, I will get back to the HF DX and attempt to log some elusive marine catches. I am also downloading the latest version of Multipsk to get some other digital modes decoded.

Please let me know what you hear so I can pass the information along to other ship enthusiasts.

Radio Loggings from the Norwegian Sun April/May 2008

Station	Time	Frequency
Radio Canada Int'l	0102Z	6100 kHz
WWV	0050Z	10,000 kHz Some Spanish interference
CHU	0055Z	7 335 kHz
	0058Z	14,670 kHz
Radio Havana	0104Z	6,000 kHz
Radio Australia	1205Z	9,580 kHz
	2250Z	15,230 kHz
	2205Z	17,785 kHz
RIA Argentina	2200Z	15,345 kHz
Manzanilla Mexico	Channels 7, 11, 13, 14, 16, 24, 66A	
	Channel 10	English communications about the Marina
San Francisco	Channel 14	Traffic control
	Channels 5A, 7A, 12, 21A, 74, 79A	
Victoria BC	Channel 11	Traffic control
	Channel 71	Used north of Vancouver

KEY TO MARINE CHANNELS

5A	156.250	14	156.700	68	156.425
7A	156.350	16	156.800	71	156.575
10	156.500	17	156.850	74	156.725
11	156.550	21A	157.050	79A	156.975
12	156.600	24	157.200		
13	156.650	66A	156.325		

What's Happening on Longwave?

❖ Northern Lights Demystified

If you've ever seen the Northern Lights in the sky, you know how just how magnificent such an experience can be. On a DXpedition to Miscou Island, New Brunswick, I had the privilege of seeing a massive and rapidly changing display of the Northern Lights. I do not expect to ever see such a vivid display again. A still shot of this display by Ken Alexander, VE3HLS, was featured on the cover of *Monitoring Times* a few years ago.

What causes the shimmering, ethereal Northern Lights to suddenly brighten and dance in a spectacular burst of colorful light and rapid movement? While the basic mechanism for how the Northern Lights are produced has been understood for years, no one – until now – has been quite sure how and why they change their appearance, often very rapidly. Using NASA satellites, researchers have discovered that an explosion of magnetic energy a third of the way to the moon powers magnetic “substorms,” causing sudden brightenings and rapid movements of the aurora borealis.

To read the complete press release, visit www.nasa.gov/mission_pages/themis/auroras/themis_power.html. This news should be of particular interest to natural radio fans.

❖ “Old School” Radio

We've written from time to time about the amazing Alexanderson Alternator system developed by Ernst Alexanderson in the early 1920s. This GE system used electro-mechanical means to produce a high powered VLF/LF signal. By spinning an alternator at high enough speeds, RF energy in the range of 20 kHz could be developed at high power levels for long-range communication. The idea worked well, and several of these huge transmitters were installed around the world.

Today, there is still one in operating condition in Grimeton, Sweden, and it is fired up on special occasions a few times a year. This station's callsign is SAQ, and it operates on a frequency of 17.2 kHz, CW emission. You'll find complete information on SAQ at www.alexander.n.se/. (Be sure to click on the English flag at the left of the page to view the English language menu.)

Although the Swedish installation is the only Alexanderson Alternator that is still in working condition, there were others in service through the 1950s. To read more about these fascinating stations, including specifics of the military installation at Marion, MA, check out the story at <http://jproc.ca/radiostor/aalt.html>.

❖ Arcs and Sparks

A few issues ago, we spoke about using the web to locate and track lightning activity at <http://webflash.ess.washington.edu/>. This month, Jim Falls, KG6FWT (CA), passes along another site worth checking out: www.strikestarus.com/. Jim adds: “I used it one night before calling an HF ARES net because of the QRN racket. It didn't help with the static, but at least I knew where it was coming from.” Thanks Jim, and if you ever do find a site that can help cure natural static, please be sure to pass it along!

Steve Sykes, W2SES (NY) sent in a nice screenshot of experimental station EAR running QRSS mode. This “PC soundcard” technique uses extremely slow CW (typically 30 seconds for one dot) to maximize the signal-to-noise ratio of a weak signals. For more information on this fascinating mode, simply enter “QRSS” in your favorite search engine. Figure 1 shows a screen capture of EAR as received from Steve's location in Victor, NY (grid FN12). He used a 14-turn 12-foot loop, a W1VD preamp, and a Harris RF-590A Receiver.

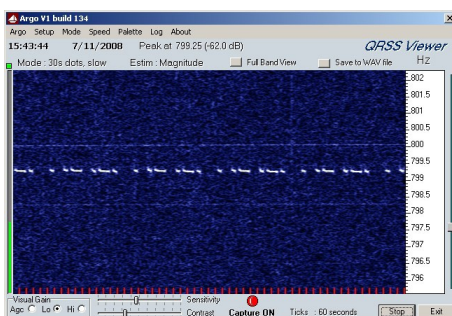


Figure 1. Screen Capture of experimental station EAR received via QRSS mode. (Image courtesy of Steve Sykes, W2SES)

❖ The A/N Range, Revisited

Dick Holbert, K2HZ (NY) enjoyed our April column on A/N Range stations. He wrote in with a few more points that may be of interest to those curious about these now-extinct stations. Dick writes: “The original 3105 and 6210 kHz frequencies for plane to 278 kHz towers were later replaced by 3023.5 kHz before it was finally phased out for tower use. That frequency is still allocated as an aviation and marine SAR frequency today.

“There was ambiguity of the A/N courses as the station was approached and then a ‘cone of silence’ directly over the station. Because of this, 75 MHz 5-Watt ‘Z’ markers were placed at the range station which sent a steady 3000 Hz

tone that illuminated a white light on the marker receiver to indicate directly over the range station. 75 MHz ‘fan’ markers were also used to identify specific points along the course range legs. These were higher power and modulated by an interrupted 3000 Hz tone to flash the white indicator.

“Present ILS 75 MHz markers use a fast-pulsed 3000 Hz tone to quickly flash the white light for the ‘inner marker,’ repeated dashes at 400 Hz for the ‘outer marker’ purple light, and 1300 Hz Morse letter ‘A’ for the ‘middle marker’ amber light.

“Rochester and Syracuse had range stations ‘ROC’ and ‘SYR.’ The Elmira range station ‘ELM’ was also a weather broadcast facility, I think it was 375 kHz but I can't find a source to confirm my memory. (This is correct. –K.C.) After the A/N range was shut down, it stayed on the air for many years as a continuous weather broadcast facility. In later days it identified as ‘Newark/Elmira Radio’ and provided regional weather and arrival info for EWR (Newark, NJ) and the NY area airports.

“Canadian weather stations provided brief scheduled weather broadcasts on their A/N ranges that lasted long after the US stations were phased out. YQA always signed off their broadcast with the message: *This is Muskoka Radio. Keep alert. Watch for other aircraft.*”

Thanks for this additional information, Dick, and we look forward to hearing from you often.

❖ View from Above

Kriss Larson (CA) sent in a photo of beacon RN (416 kHz), one of the outer markers for the Kansas City, KS airport (see Figure 2). As you can see, this beacon is installed in the middle of a corn field. Kriss also passed along a web address for getting a bird's eye view of many beacon sites (or other geographic locations). You'll find it at <http://maps.live.com>.



Figure 2. Photo of beacon RN (416 kHz), Kansas City, KS. (Photo courtesy of Kriss Larson)

Pirate Flame War Subsides

The flame war among North American pirate radio operators fortunately diminished during late summer 2008. The attacks on individuals who some have alleged to be pirate radio operators have not utterly disappeared, but the volume of such entirely counterproductive broadcasts have declined considerably on the shortwave pirate bands and other venues. A small number of pirate radio operators apparently lost their common sense for a while, but, fortunately for the pirate radio scene, they have regained it for the most part.

❖ Insinger Wins Contest

Adrian Peterson of **Adventist World Radio** has announced the winners in the AWR "Wavescan" 2008 DX contest. Ed Insinger, one of the editors of the *Free Radio Weekly* pirate newsletter, was the continental USA winner in this year's contest. He gets his choice of prizes between either a *World Radio and Television Handbook* or a copy of *Passport to World Band Radio*. Congratulations, Ed!

❖ Jamming

Some countries still jam shortwave programming that is targeted to them. Dan Henderson heard an interesting quasi-clandestine example of this. He noted the Voice of Oromo Liberation with their "Sagalee Bilisummaa Oromo" ID. This program is transmitted to Ethiopia from the Wertachtal transmitter site in Germany. He heard it on 13830 kHz at 1700 UTC. Dan says that the vigorous jamming of this signal probably comes from Ethiopia, and that its effectiveness varies between 10% to 100%. If you have not heard jamming transmissions before, this one is worth a check.

❖ Halloween Coming Up

DXers who are not familiar with pirate radio are sometimes not aware that Halloween is considered the biggest pirate holiday of the year. Most years, October 31 features more pirate radio broadcasts than any other day of the year. In the past, special Halloween productions from several pirates also aired during the weekend prior to Halloween and also during the weekend after the holiday. Since Halloween falls on a Friday this year, it is likely that the following weekend could produce the largest number of pirate radio broadcasts for 2008 in North America.

❖ FM Pirates Still There

Despite fairly frequent busts of FM band stations by the Federal Communications Commission, dozens of local pirates remain on the air across the United States every day. Occasionally these stations generate local media coverage. For instance, during the summer, the *Boston Globe* printed an analysis of TOUCH-FM, a Boston pirate that has operated at times from the Dorchester neighborhood of Boston in recent years.

The FCC fined Charles Clemons of Boston for allegedly operating this station as early as 1966, using a slogan of "The Fabric of the Black Community." The *Globe* reported that the station sometimes returns to the air on 106.1 MHz, despite a prior \$17,000 FCC fine. The station is even pushing legislation titled the Local Community Radio Act in the US House of Representatives. The bill would increase the number of local community low power radio stations that could operate in large United States cities. Stay tuned.

❖ What We Are Hearing

Monitoring Times readers heard two dozen different pirate radio stations this month. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regularly announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through the pirate radio band to find the stations, but more than 95% of all North American shortwave pirate broadcasts are heard on **6925 kHz**, plus or minus 30 or 40 kHz.

Artificial Intelligence Radio- This one is puzzling.

They mix rock oldies and new age music with psychological analysis parodies. During some broadcasts they also have given an ID as **International Shortwave**. (None known)

Grasscutter Radio- The classic rock music on this veteran station appeared frequently on the pirate bands during the summer. (grasscutterrado@yahoo.com)

Hour of Slack Relay- Some pirate has been relaying the elaborate and hilarious syndicated satire shows of J. R. "Bob" Dobbs from the Church of the Subgenius in Dallas, TX and Cleveland Heights, OH. (Web site: www.subgenius.com/ts/hos.html; stang@subgenius.com)

International Shortwave- This appears to be an alternative identification that is sometimes used by **Artificial Intelligence Radio**. (None known)

KFUD- This apparently is a new station. They follow Elmer Fudd as he attempts to Kill the Wabbit. (None known)

Kracker Radio- His rock music and comedy make good use of spare time while he runs for Vice President of the USA on the Commander Bunny for President ticket. (krackerradio@pmlol.com)

MAC Radio- Classic rock has made it on the playlist of this oldies rock pirate. They are still found various odd frequencies such as 3275, 6850, 6925 and 6950 kHz. (macshortwave@yahoo.com)

Maple Leaf Radio- As we see here this month, their Canadian National Anthem as their interval signal and their music by Canadian artists produce a Canadian QSL. (radio.mapleleaf@gmail.com)

QSL Number: /8

6925 Kilocycles Upper Sideband



Northwoods Radio- "Broadcasting from the Great Lakes," their loon call interval signal precedes their rock music programs. (northwoodsradio@yahoo.com)

Radio Appalachia- Country and Appalachian music from Moundsville, WV uses a slogan of the "Voice of the Ohio Valley." (None)

Radio Jamba International- Rock and novelty music with a healthy dose of humor is their standard fare. (Belfast)

Radio Free Speech- Bill O. Rights emphasizes freedom and the USA constitution. The shows are a mix of rock music and comedy. (Belfast)

Random Radio- They are the current champion for variable programming formats. They have various musical styles, and sometimes they just run parodies of religious broadcasters. (None; asks for reports via the FRN web site)

Sunshine Radio- Their friendly female announcer produces rock music shows. (grasscutterrado@yahoo.com)

Sycko Radio- Their rock music and comedy format has been on more frequently lately with a slogan of "the spirit of pirate radio." (syckoradio@yahoo.com)

The Crystal Ship- The "Voice of the Blue States Republic" is still on variable frequencies such as 5385 and 6700 kHz with classic rock music and left wing political commentary. But, the Poet has announced that his transmission frequency will be more erratic for a while. (Belfast and tcshortwave@yahoo.com)

The Wave- They have been on fairly frequently with classic rock music productions. (Belfast)

Voice of Brian Wilson- What apparently was their first broadcast featured a fable about a prince who found a magic radio in his attic. (None)

WBNT- This Rodent Revolution clandestine parody is still dominated by Commander Bunny's campaign for President of the United States. (Belfast and rodentrevolutionhq@yahoo.com)

Continued on page 71

OCTOBER OLIO

We are well and truly through the summer doldrums and ready to move on to the prime DX season. That "Lucky Old Sun" may have nothing better to do than roam around heaven all day, but while Ole Sol is performing that duty, the spots on his surface are beginning to pop. Things should be moving along toward the next great Solar Cycle, and hopefully this winter season will bring us the DX we all have been waiting for.

In preparation for the coming season, I like to clear things off my desk and, often as not, that means composing a column that is more stream of consciousness than anything else, but hang in there: I promise it will be entertaining and, as Bill Cosby used to say, "You might just learn something!"

❖ The Last HOPE

Once again I had the privilege of being part of a speaker's panel on the subject of Amateur Radio at "The Last HOPE" in New York City in July. For those of you not conversant in the "geek" world, HOPE stands for Hackers On Planet Earth.

Don't be frightened by the term Hacker. It has a long and proud history, going back long before it was co-opted by folks in the press to express negative views of some computer hobbyists. You can see for yourself by reading Steven Levy's seminal work "Hackers." Speaking of Mr. Levy, he was present at this year's conference and he even signed my well-worn paperback copy of "Hackers." But I digress.

HOPE conferences are always full of a lot of energy and opportunities to learn many things. Our panel discussion, entitled "Off the Grid -

Voice/Data Communications," was a packed house. Who says ham radio is a dying hobby? Lots of folks I met this year not only wanted to be hams, they wanted to get into building their own equipment. The desire to understand how the world works is the foundation of both the hacker and the ham mindset. The Last HOPE allowed this to flourish and led to opportunities to grow the ranks of our hobby.

In addition to participating in my panel discussion, I assisted in setting up and operating the Special Event Station W2H for the duration of the conference. While running this station, our team of hams had the chance to talk to many people about taking the exam during the VE session offered on the final day of the event.

Two years ago, at HOPE Number Six, I was able to report a total of 11 new hams from the VE process, a great first effort. I am very happy to report that this year exceeded our wildest expectations. A total of 49 people passed their exams at The Last HOPE! This means that The Last HOPE is part of our hope for the future of amateur radio.

By the way, don't let the title The Last HOPE make you think the show is over. The Next HOPE has already been planned for summer 2010. Plan to join in the fun. I'll be there!

❖ Now for Something Completely Different

From time to time, I run across a product or service that, normally, wouldn't seem to be related to amateur radio in any way. But then, upon further reflection, I come to see how this thing can be an important tool for many hams. Let

me start with a scenario and then go into detail.

You are participating as a communications support operator for a local walk-a-thon. You have been assigned a check point and you head off to that duty station. When you get there, you meet a couple of folks related to the event, strangers to you until that morning. The day gets hot and you forgot to pack sufficient water. Maybe you forgot to take your medication that morning before heading out to the event. You try to tough it out, but that sun up in the sky is tougher than you are. You pass out from the heat.

Now what? The folks around you probably have little more than your first name to go on. Even laying there on the ground with your eyes rolled back in your head, you can help them help you.

ROAD ID
www.roadid.com
1-800-345-6336

Road ID makes a series of products designed to give information about you when you are incapacitated. More than a simple "medic alert" type bracelet, Road ID can be configured to put contact information as well as personal and medical information in a spot that is easy to discover, should you be off your pins. I first got into using Road ID in relation to my bicycling activities. I ran across more than a few cyclists who said their Road ID saved their bacon.

The Road ID has a metal tag that can contain up to 7 lines of laser etched information. They also have an "interactive" tag that gives a number to call and a serial number. This allows the person trying to give you aid a place to contact for more detailed personal or medical information if needed. The Road ID is available as a wrist band, ankle band, shoe pouch or necklace.

I have been wearing the wristband for a couple of years now. As you know, I am a dedicated Adventure Amateur Radio Operator. I like to bike, kayak, and hike, taking ham radio out into the woods and wilds whenever I get the chance. So far I haven't done anything (or had anything done to me) to put my Road ID to work. But I sure feel a lot better knowing that it is there to talk for me when I can't.

We talk a great deal about Emergency Preparedness in our hobby. Personal safety identification should be part of that discussion.

❖ D-STAR System Update

As you may recall, a few months back MT/Grove Enterprises and Icom America provided a D-STAR system to the Jersey Cape D-Star



Users Group. You may have been following this installation and operation at their www.jcdug.org/ website.

I checked in with the JCDUG Team recently to see how things are going. They have been very busy bringing this system up to full song. Allow me to paraphrase from the group's own report on matters.

They no longer use the repeater callsign KC2SWE, having recently received a new (and very appropriate) call, NJ2DS. Going with the new callsign was cool, but had its drawbacks.

Changing the repeater's call on the D-Star Gateway was no small thing. The Texas Interconnect Team, keepers of the Gateway, had to totally remove the system's previous data. That was followed by a 48 hour wait for the removal of the information to take place on all D-Star repeater servers on the network – not unlike having a change on a web server propagate through the Domain Name Service (DNS) servers. Then the group had to reregister the system with the NJ2DS callsign. This included registering all the user's data all over again as well.

The group encountered a few teething problems. They got the repeaters up and running, only to discover that they had an "alligator system," all mouth and no ears. The 2 meter and 440 MHz repeaters could be heard from much greater distances than users were heard by the repeater. The group spent many hours at the repeater site with a service monitor looking at receive sensitivity.

The 1.2 GHz data, 2 meter and 440 MHz repeater modules receive by way of a Comet GP-95 at the tower top. This is a tri-band antenna that they ported to the individual repeater modules via a triplexer/combiner. There were problems with the shielding of the 440 MHz section. The group was able to correct this problem and get the system working at optimum performance.

The local Cape May County RACES/ARES group has been operating their repeater without a duplexer via separate receive and transmit antennas. The JCDUG team decided to follow the same process. The NJ2DS D-Star system now uses three tri-band antennas. They are arrayed on the tower as follows: 1.2 GHz data, actually a digipeater, transmits and receives on an antenna at 165 feet. This same 165-ft antenna provides receive for the 2 meter and 440 MHz voice repeaters. An antenna at 127 feet provides receive for the 1.2 GHz voice module and transmits 2 meter and 440 MHz voice. Finally, 1.2 GHz voice is transmitted on an antenna at 105 feet.

The vertical separation of transmit and receive gives some respectable TX/RX isolation, especially on 1.2 GHz and 440 MHz. Further isolation was achieved by using the system's 2 meter and 440 MHz duplexers as band pass/band reject filters. This is achieved by removing the duplexer "T" connectors and running RX and TX through their respective cavities. This configuration demonstrates that hams can always find a better way to make things work to their advantage.

The group completed their system with the addition of Advanced Receive 17db preamplifiers on the 2 meter and 440 MHz receive lines. The system's receive is now razor sharp, and the 2 meter and 440 MHz repeaters now hear much further than they heard prior to these changes.

The group is done with hardware tweaking for the time being. They are thinking about adding a 100 watt continuous duty 440 MHz amp as a future project.

The JCDUG has started working with both slow speed and high speed data. At the Cape May County 4-H fair, the local RACES/ARES groups ran amateur radio demonstrations. The JCDUG provided a DSL speed internet connection using the 1.2 GHz data repeater. They made use of the D-Rats and D-Chat programs to demonstrate texting and sending radio-grams.

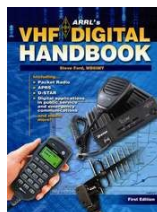
The JCDUG has taken D-STAR to its full potential. They have created a reliable asset to the Cape May County amateur radio community with potential to provide extended emergency service support throughout the region.

I'll be checking in on the group again in the near future. This is a project worth following!

❖ Digital Communications

Speaking of digital communications, another great book is available from The American Radio Relay League

ARRL'S VHF DIGITAL HANDBOOK
First Edition
by Steve Ford WB8IMY
ARRL Order # 1220
\$19.95
The American Radio Relay League
225 Main Street
Newington, CT 06111-1494
www.arrl.org/shop
1-888-277-5289



When I began my amateur radio career in the mid 1970s, ham radio had limited applications in what could loosely be called digital communications. Some folks argue that CW is a digital mode, and there was RTTY (Baudot only, ASCII was still verboten). Some folks played with FAX transmission, sort of digital depending on how you define it. When that computer revolution – talked about in the above-mentioned Levy book "Hackers" – began in earnest, first we got ASCII RTTY, then the floodgates opened. A modern ham radio operator can indulge a plethora of digital operating modes and methods. So many, in fact, you can't tell the players without a program. Steve WB8IMY's book is just the program you need to get with the program, so to speak.

The book begins with a chapter covering the most basic (and user friendly) of digital modes, packet radio. Steve goes into all the details of setting up a packet station, either with a Terminal Node Controller (TNC) or by using a PC sound card as the TNC. There is a complete examination of popular packet network systems, including NET/ROM, TheNet, ROSE, TextNet, FlexNet and, of course, Packet Clusters.

With a thorough understanding of packet radio fundamentals in place, the book moves on to the popular packet operating activity, the Automatic Position Reporting System (APRS). Steve gives a complete explanation of Bob Bruninga WB4APR's labor of love and practical tools for emergency (and other) communications activities. This segues into a chapter on packet

UNCLE SKIP'S CONTEST CALENDAR
YLRL Anniversary Party (CW) Oct 3 1400 UTC - Oct 5 0200 UTC
California QSO Party Oct 4 1600 UTC - Oct 5 2200 UTC
RSGB 21/28 MHZ Contest Oct 5 0700 -1900 UTC
10-10 International Day Sprint Oct 10 0100 - 2359 UTC
YLRL Anniversary Party (SSB) Oct 10 1400 UTC - Oct 12 0200 UTC
FISTS Fall Sprint Oct 11 1700 - 2100 UTC
Pennsylvania QSO Party Oct 11 1600 UTC - Oct 12 2200 UTC
Illinois QSO Party Oct 19 1700 UTC - Oct 20 0100 UTC
School Club Roundup Oct 20 1300 UTC - Oct 24 2359 UTC
CQ Worldwide DX Contest SSB Oct 25 0000 UTC - Oct 26 2400 UTC
10-10 Int. Fall Contest CW and Digital Oct 25 0001 UTC - Oct 26 2359 UTC

radio and public service operation, the place where packet really shows itself to be an essential amateur radio tool.

But wait! There is so much more! The book includes a chapter on D-STAR. If you want to join in with my buddies in Cape May, this chapter is must reading. This is followed by a look at weak signal digital work, including Moon Bounce communications using modes such as WSJT. For folks looking to move things to the next level through experimentation, there are studies of applying the APCO-25 standard to ham radio as well as High Speed Multimedia (HSMM) Radio. Appendices cover the AX.25 Link Access Protocol (the heart and soul of packet radio operation), a full technical description of the D-STAR System and further examination of the technical aspects of the APCO-25 protocol.

Maybe one of the most positive things about the current licensing structure is that most of the exciting digital operating modes are made available to even the entry level Technician Class licensee. Is it any wonder that so many folks at a "hacker" convention mentioned above would want to get their amateur radio licenses? Mix computers with ham radio? What a concept!

Have fun! I'll see you on the bottom end of 40 Meters.

MT READERS ONLY

To access the restricted website for the month of October, go to www.monitoringtimes.com, click on the key, and when prompted, enter "mtreader" under the user name. Your password for October is "ghosts" – Check in each month for new material!



Let's Talk About Antennas Part Two of Three

Last month, in discussing the effect of received noise on reception, we found that, in general, the higher the strength of a desired signal in relation to the strength of the received-noise (signal-to-noise ratio, or S/N) the better the reception. So this month we consider how to increase the S/N by our choice of antenna, and how we install our antenna system. We'll also introduce the idea of antenna radiation patterns, and their effect on wave propagation and reception. We'll also continue our examination of the value of antenna gain in radio communication.

As you read the discussion below, don't forget to keep in mind the reciprocity principle: characteristics of an antenna, including gain and radiation patterns, remain the same whether the antenna is used for transmitting or receiving.

❖ Reducing Received Noise:

Proximity:

Electrical noise is more intense close to its source. Noise fields, such as those common around electrical machinery and many other electrical devices, can be detected with a portable receiver. Once located, you can then locate your antenna away from noisy areas. Also avoid running antenna lead-in cable through such fields. Coaxial cable shields the signal it carries. So, if for practical reasons it is

necessary to run the lead-in through the noise field, use coaxial-cable lead-in.

Polarization:

Signals and antennas both have a characteristic "polarization." Antennas with horizontal elements usually have horizontally-oriented electrical fields, and thus produce horizontal polarization. For reception, they also respond best to signals with horizontal polarization. Vertical antennas generally produce vertically-polarized signals, and respond best to signals with vertical polarization.

Electrical noise tends to be vertically polarized. Thus, horizontally-polarized antennas generally capture less electrical noise than do vertically-polarized antennas. Television broadcast stations in the USA transmit horizontally-polarized signals for this reason.

Radiation Patterns:

Antenna response, both in transmitting and receiving, is generally not distributed evenly in space. Even the so-called non-directional antennas have at least some unevenness in how they respond in different compass directions and at different vertical angles. By appropriate design, we can produce antennas which have very significant differences in how they respond in different compass directions (horizontal radiation patterns, fig. 1A) or at different vertical angles (vertical radiation patterns, fig. 1B).

The compass directions or the vertical angles at which an antenna directs a major part

of its functioning are called "lobes" (fig. 1A, and fig. 1B). Compass directions or vertical angles where minimal responding is directed are called "nulls" (fig. 1A, and fig. 1B).

Antennas that have very sharp nulls in their horizontal radiation patterns can often be oriented such that problematic noise signals arriving at the antenna arrive at a position on the pattern where there is a null. Thus, the strength of the noise can be reduced or eliminated. Small table-top loops have such nulls and are useful for medium-wave reception where they can be rotated to orient their sharp nulls toward the direction of arrival of interference. The Beverage or wave antenna has both sharp lobes and sharp nulls. It is useful for reducing interference using the nulls and emphasizing the desired signal via the main lobe in medium and low frequency receiving.

The small loops and Beverage antennas just mentioned both have low gain. However, given their reduction of noise and consequently improved S/N, they can sometimes provide good reception when other, higher-gain antennas with less-discriminating radiation patterns cannot support useful reception.

Vertical-angle radiation patterns are also important in both transmitting and receiving. In the HF and MF bands the vertical-radiation angle can determine whether the waves launched are more likely to propagate to far-away places or to locations closer in the transmitting antenna.

For reception on these same bands, the complement of this is true: the vertical-radiation

pattern of the antenna determines whether it responds maximally to high-angle waves from closer-in stations, or more to lower-angle signals from more distant stations. For VHF and higher frequencies, low-vertical angles are usually desirable, allowing signals to reach as far toward the horizon as possible, or even a bit beyond.

❖ Antenna Gain Can be Useful

Earlier we discussed why high antenna-gain levels are often not necessarily useful or even desirable. But in some situations, having high antenna gain is important. When received-noise level is low, then antenna gain can often bring a weak signal level up to provide good reception. Note that

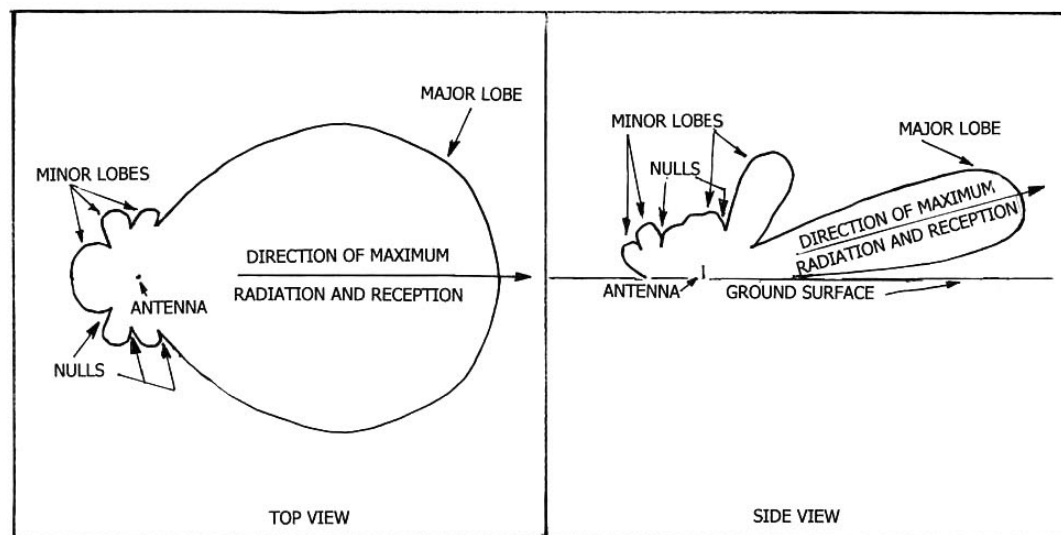


Fig. 1. THE HORIZONTAL-RADIATION PATTERN FOR A CERTAIN BEAM ANTENNA (A), AND THE VERTICAL RADIATION PATTERN FOR THE SAME ANTENNA (B)

This Month's Interesting Antenna-Related Web site:

A good discussion of antennas:
www.answers.com/radio%20antennas
Discussion of noise in radio:
[http://en.wikipedia.org/wiki/Noise_\(radio\)](http://en.wikipedia.org/wiki/Noise_(radio))

this refers to "weak" signal reception. For strong signals, the S/N will be favorable without need for extra antenna gain.

To understand the "why" of the last paragraph, consider that when received noise is low, then the noise generated within the circuits of the receiver itself becomes the dominant noise that interferes (competes) with the desired signal. So, in a low received-noise situation, the received-noise level increase due to antenna gain is inconsequential compared to the noise from the receiver's circuits. So, with increased antenna gain, the increased strength of the desired signal yields an increased S/N, and reception improves.

Received-noise levels tend to decrease as frequency increases. So we find that antenna gain often becomes useful for weak-signal reception at frequencies above 10 MHz or so, depending on conditions at your location. Antenna gain is almost always useful for improving weak-signal reception at VHF and higher frequencies.

When an antenna is used for transmitting, the more gain it has in the direction of the distant station with which it is communicating, the more signal it puts into that distant antenna. For the transmitting antenna, noise is not a concern, so gain in a transmitting antenna – for any fre-

RADIO RIDDLES

Last Month:

I wrote: "Once there was a very poor train conductor. He seldom had even one dollar in his pocket because he gambled away most of the salary the railway line paid him for collecting tickets from their passengers. He was so poor, hungry, and unhappy that he saw no reason to go on living, and so he decided to kill himself.

"He thought electrocution would be a good way to leave this world, and so he broke into a powerful radio station, and placed his hands directly across the high-voltage, output terminals in the radio-frequency power-amplifier stage of the station's 500,000 watt

frequency – generally leads to an improved S/N at the receiving antenna. In addition, if antenna gain is increased, then the amount of transmitted power required for successful communication is reduced.

Next Month

In our last segment, we'll consider some other factors important in selecting an antenna for your application and for getting good performance from the antenna once it is in operation.

transmitter. However, he was not hurt at all: he received only a tiny shock. Why?"

Well, electrical current will flow only through a conductor. The better the conductor, the more current will flow. So, because he was such a poor conductor, only a tiny amount of electrical current could flow through him. [All together now: Groan - ed.]

This Month:

Since the unhappy man in last month's riddle performed so poorly as a conductor, perhaps his title should be changed from "conductor" to something different. But what?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

Antenna Designer

New Version 2.1 for Microsoft Windows 95 and 98

Computer program helps you design and build 17 different antennas from common materials. Based on Antenna Handbook by W. Clem Small.

Only \$39.95

\$5 S/H on all orders
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Shipped on CD ROM

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Small Planet Systems
623 Mangels Avenue
San Francisco, CA 94127

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1929 Breadboard Transmitters

As the BBC's Monty Python might say, "And now for something completely different!" This month, for a change, let's talk about radio *transmitters* rather than receivers, and let's go back to the late 1920s – one of the golden ages of amateur radio activity.

Each year, in early December, a group of Antique Wireless Association members gets together on the air to contact each other using replica transmitters employing 1929 and earlier circuitry. The event, named for one of the co-founders of AWA who was also an enthusiastic student of vintage radio, is called "The Bruce Kelley 1929 QSO party." It's held on the 40- and 80-meter ham bands. Read some more about it at the AWA web site (see ad on these pages).

When the exact times and frequencies are determined, I'll announce them in this column so interested readers can listen in. All communications are via CW (Morse code). But even if you don't happen to know the code, it's easy to pick out the letters for "AWA" used by contest participants to announce themselves and fun to hear the distinctive "yawps" and "yoops" of CW produced by vintage oscillator circuitry.

❖ Four Typical Circuits

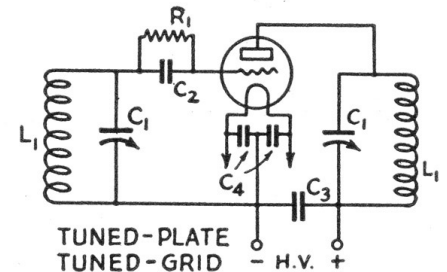
The four most popular oscillator circuits back in the 1920s and also in the Kelley event are all "self-controlled." That is, their r.f. signal is not generated by a quartz crystal, but rather by a feedback condition established between the plate and grid circuits of the single tube used in the circuit. The four circuits are known as the Hartley, Colpitts, Tuned Plate Tuned Grid (TPTG) and Tuned Not Tuned (TNT).

Simplified diagrams of the circuits, taken from the 1936 edition of the ARRL *Radio Amateur's Handbook*, are included with this article. The tube used is generally a type 10 (now getting

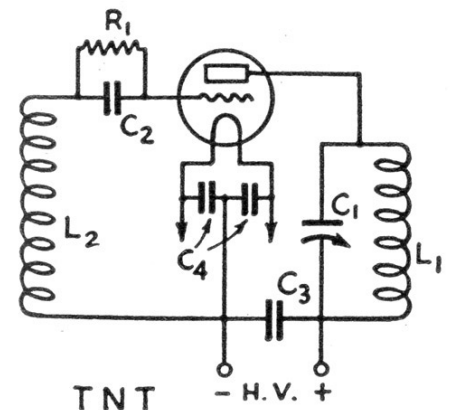
hard to find) or a type 45. Power input is generally about 10 watts. The circuits are usually built up on flat wooden boards, known as breadboards, because many were commandeered from this household function.

In the Hartley circuit, operating frequency is determined by the "tank" coil (at left) and its associated capacitor C1. Note that the coil is tapped, with the bottom portion in the grid circuit and the top portion in the plate circuit. The position of the tap determines the degree of feedback and is adjusted for the most stable and reliable operation. The Hartley is considered to be the easiest of the self-controlled circuits to put into operation, though positioning of the tap can be tricky.

The Colpitts circuit is very similar to the Hartley, except that the degree of feedback is controlled by the ratio of the values of capacitors C1 (the values are usually different in spite of the identical nomenclature) instead of by the position of a tap on the coil. Operating frequency is determined by the tank coil and the total value of capacitors C1. In actual practice, capacitors C1 are fixed units selected to provide proper feedback, and a variable capacitor is connected across the fixed ones to control frequency.



TNT circuit, the grid tank has no variable capacitor. The required capacitance is supplied by the distributed capacitance of the coil and the capacitance of the tube and other circuitry. The TNT is also easier to adjust than the TPTG, at least once the proper size of the grid coil is determined, because there is no grid capacitor to tweak.

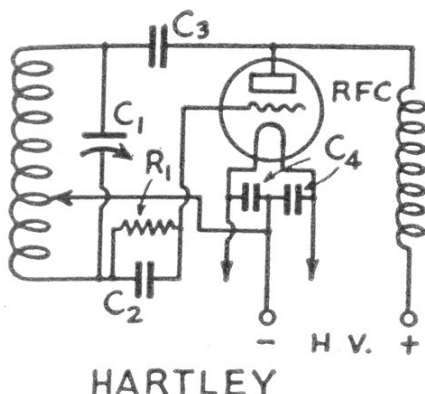


❖ A Practical Hartley Oscillator

Adventurous hams interested in building a 1929-style 80-meter Hartley will find (Figure 1) a practical schematic as described by Bob Raide in his article "An Inexpensive Way To Build a 1929 Transmitter" from the August, 1998 *Old Timer's Bulletin* – a predecessor of *The AWA Journal*. The *Journal* is published by the Antique Wireless Association (see ad on these pages). I'm also including a picture of a Hartley that I built from specs very similar to Bob's. Bob built his power supply right on the same breadboard as the oscillator itself, while mine was built as a separate unit; it does not show in the picture.

Special Notes

Now let's go through Bob's schematic from left to right and discuss some necessary notes. At the far left is the antenna link coil, which is



The Colpitts is a little more difficult to get into operation. However, once the values of capacitors C1 are selected for optimum performance, operation becomes very stable with no coil tap to get out of adjustment.

Note that in the TPTG arrangement, there are two tank circuits, one associated with the grid (at left); the other with the plate. These circuits are not coupled inductively. The coupling necessary to establish oscillation takes place via the grid-plate capacity of the tube. The grid tuned circuit primarily controls the degree of feedback; the plate tuned circuit primarily determines frequency.

The TNT is a variation of the TPTG circuit that is a little more economical to build. In the

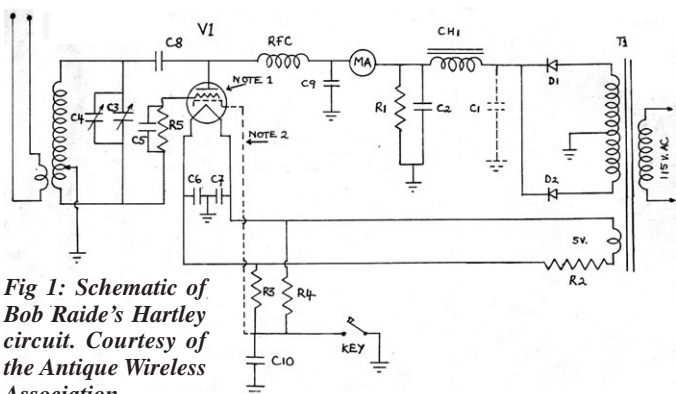


Fig 1: Schematic of Bob Raide's Hartley circuit. Courtesy of the Antique Wireless Association.

a circle of stiff wire, same diameter as the coil. It's arranged on a hinge, mounted near the center of the coil, and wired to a coax connector. Move it in and out between the turns to adjust antenna loading. To the right of that is the tapped tank coil. Its 12 turns are 3 inches in diameter and formed of 1/4-inch copper tubing. About 12 feet of tubing are required.

Be sure to use heavy copper strap to connect the coil and capacitors. High currents flow here! The tap connection is made via a small alligator clip so that its position on the coil can be changed. Capacitor C3 is the main frequency control, while C4 is convenient for making fine frequency adjustments.

The copper strap connections show clearly in the picture of my Hartley. Note also the metal plate on the panel holding the variable capacitors. This is connected to circuit ground and is there to minimize hand capacity effects that can cause changes of transmitter frequency as your hand approaches the tuning knobs.

As mentioned, the tube currently used is generally a type 45 since the favorite of earlier times, the type 10, is very hard to find. Though you *can* find them, 45s aren't cheap. I've seen them priced at over \$35.00 used. Other 1929-era possibilities are the types 27, 71-A and 24-A. These are generally available for a few dollars.

Note 1, on the schematic, is to remind those using a 24-A to tie the screen grid to the plate – ef-

fectively converting it to a triode. Note 2 shows how to connect the cathode of the type 27 (the only tube in the group having one). The size of 2-watt grid leak resistor R5 depends upon the tube you select. Use a 10k resistor for types 71-A or 45; use 30-50k for types 24-A or 27.

The Hartley Power Supply

Moving over to the power circuits, notice that filter capacitor C1 is shown as optional. If your power transformer provides 300 volts using only CH1 and C2 (choke input filter), that's fine. But if the voltage is a little low, you can boost it by perhaps 25% by adding C1.

Lighting the tube you choose may take a little doing. The 24-A and 27 require 2.5 volts at 1.75 amps; the 45 requires 2.5 volts at 1.5 amps; the 71-A lights up with 5 volts at 0.25 amps. If you can find a separate 2.5-volt, 2-amp transformer as I did, you have an easy way to take care of a 24-A, 27, or 45.

Otherwise, check the filament windings on your main power transformer. There will very likely be a 6.3-volt winding and also (with transformers made for older sets) a separate 5-volt winding that would have lit the rectifier tube. Such a winding is perfect for direct connection to a 71-A.

For other tubes, use the 5-volt winding – if you have one – in series with a resistance to supply the necessary 2.5 volts. If you have only a 6.3-volt winding, use that one. The 45 will require a different resistance than the 24-A or 27 – even though the filament voltages are the same – because its current draw is different. The 71-A filament can also be powered from the 6.3-volt winding via a resistor.

A discussion of how to put together the series resistances necessary to provide proper filament voltages for various tubes using transformer filament windings is beyond the scope of this article. Keep in mind, though, that Ohm's law, as well as the formulas for calculating resistances in parallel, will work reasonably well – at least as a starting

point – even though they are intended for d.c. rather than a.c. circuits. Radio Shack sells 1-ohm and half-ohm 10 watt resistors that are useful in making up resistance networks.

Startup

With your wiring completed and the power supply, key, and antenna dummy load connected, you're ready for testing. Place the antenna link halfway into the coil, set the tap near the plate end of the coil, mesh the main tuning capacitor halfway, turn on the power supply and briefly tap the key. Chances are that your plate current milliammeter will "pin," indicating too much feedback.

By degrees, move the tap closer to the grid end of the coil, testing by briefly closing the key at each position. Eventually you should find a position where the plate current remains steady at some point within the range of the meter. Now move the link coil in or out until the plate current is 30 mA, equivalent to 9 watts input. This is just under the 10 watts that is close to both the tube maximum and the maximum specified in the rules of the "1929 QSO Party."

Large Collection for Sale

Recently received at *MT* was a notice concerning the sale of a number of choice antique radio items. Pictures will be found at www.radiolaguy.com/info/MakeAnOffer.htm. Only inquiries that include an offer will be considered – after which further details will be supplied. Of course, the offer may later be withdrawn. Publication of this notice does not imply endorsement by *MT* or its staff.

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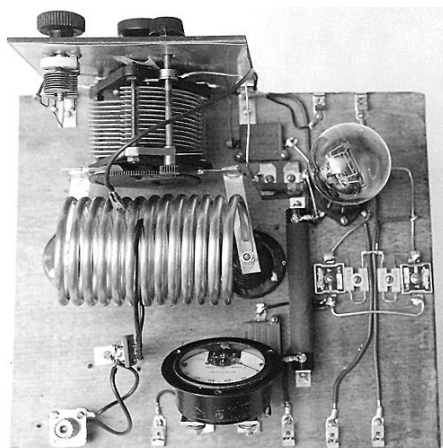
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Parts List For the Bob Raide Hartley

T1	power transformer, 300-350V each side of ct @ 100 mA plus filament winding (see text)
CH1	filter Choke, 5-10Hy @100 mA, low resistance
D1, D2	silicon Diodes, 1 kV or better PIV @ 2A
C1, C2	20 uF, 450 V (see text re. C1)
C3	350 pF receiving type variable
C4	50-75 pF small variable for vernier tuning
C5	250-500 pF, 200V ceramic
C6-C9	.002 uF, 600V disc or ceramic
C10	.5 to 1 uF, 200V (to shape keying waveform)
R1	15 k, 20-25W bleeder
R2	filament dropping resistor (see text)
R3, R4	15-20 ohms (both same value), 1-2W
R5	2-watt grid leak-see text for resistance
RFC	r.f. choke - 2.5 mHy, 100 mA - or wind about 100 turns #30 enameled wire on 1/2" dowel stock
MA	0-50 d.c. milliammeter



Here's my own interpretation of the Hartley circuit. But I can't take credit for the coil; it was wound for me by an expert.

Alinco DM-330MV Power Supply

By Bob Grove, W8JHD

While a new power supply is not really big news, this one is different. Not just because it's a switching power supply rather than the conventional linear transformer variety, but because of a proprietary patented circuit that suppresses the radio-frequency noise that commonly accompanies switching power supplies.

Switching power supplies are increasing in popularity for several reasons, but primarily because of their considerably reduced size and weight (see accompanying photo). The little Alinco DM-330MV measures only 6.9" wide, by 2.6" high, by 6.6" deep.



❖ A Little Theory

In its simplest form, a DC power supply contains a transformer, rectifier and filter capacitors. A husky power transformer can make these beasts big and heavy. Switching supplies, however, contain active circuitry to regulate the DC voltage. Therein lies the noise problem.

The switching circuitry, generally in the 10-20 kHz range, produces square waves capable of generating a spectrum of harmonics which can interfere with receiving equipment. Alinco's answer is splendidly simple: If you hear the noise, simply change the switching frequency so that the harmonic is out of the receiver's passband! A front panel "Noise Offset" control is provided for that function.

Fortunately, the harmonics grow weaker as the frequency grows higher, so switching noise is most troublesome in the low and medium frequency bands, but virtually disappears in the VHF and UHF spectrum. Alinco's all-metal case and internal filtering help shield the harmonics as well.

Our test of this noise offset feature is described below.

❖ Full featured

Powered by a standard 120 VAC 60 Hz main, the DM-330MV produces variable 5-15 VDC at currents of at least 30 amps continuously (32 amps intermittently). Regulation is better than 2%, with less than 15 mV p-p ripple, and any short circuits drawing more than 32 amps, or excessive heat, activates the protection circuitry, shutting down the power supply delivery.



A back-lit front panel meter indicates voltage and current. Light-duty accessories can be powered by two pairs of 5 amp spring terminals, a 10 amp cigarette lighter jack, or the husky 32 amp rear-panel terminals. The front-panel voltage control has a midpoint detent set to deliver nominal 13.8 VDC to emulate the mobile DC environment for typical base/mobile radios.

A rear-panel memory preset allows the user to define the desired output voltage so that at turn-on, that voltage will be provided regardless of the setting of the front-panel voltage control (which is then disabled).

The voltage control may be operated remotely by the inveterate experimenter with the addition of a user-provided 10K potentiometer and two resistors (4.7K and 15K ohms), plugged into the 1/8" (3.5 mm) rear-panel jack.

❖ Let's Test It

While we had no doubt that the little package could deliver the power it promised, we were curious just how well the RF noise reduction system worked. The unit was set up with a worst-case scenario: a portable, multi-band radio, whip fully extended, was set right on top of it. If anything would pick up radiated noise, *that* would!

Sure enough, when the radio was tuned to the AM broadcast band, harmonic whistles (heterodynes of the harmonic carriers beating against the broadcast carriers) abounded. However, true to the advertising, when the noise offset knob was carefully tuned, the interference moved away from the tuned frequency.

Moving up in frequency to the lower shortwave ranges, the whistles could still be

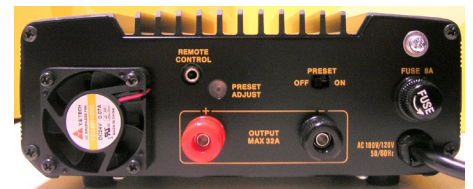
heard – and tuned out. Above approximately 10 MHz the whistles were pretty well gone.

In reality, of course, very few serious shortwave or AM broadcast listeners are going to park a portable radio on top of the power supply. An outdoor antenna connected via coaxial cable to the radio virtually eliminates the problem to begin with, and at the higher frequencies, VHF/UHF scanner listeners have nothing to concern themselves with.

❖ And Finally, Power Delivery

So how well does it do its job of delivering high current levels? For this task, I attached a resistive load to a pair of home-made test leads and plugged the rig into the high-current rear terminals. Then I cranked up the voltage to deliver a current drain of a constant 30 amps, the maximum continuous-current rating for the supply. After a minute or so, my test leads began to melt, and my resistive load started to smoke, but the power supply just sat there cranking out the load without varying in its regulated voltage!

To prevent overheating of the power supply, a thermistor-activated fan, visible on the rear panel photo, assists heat transfer from the case. I began to wonder when the fan would come on, but the case was only warm, not hot. Just out of curiosity, I looked at the fan and it *was* on; it's just so silent I didn't hear it! An impressive touch in design.



❖ The Bottom Line

This power supply really delivers its promise. Its small footprint makes it an easy fit on any equipment bench, desk or table. The stable, variable voltage gives it universal application for a wide variety of electronic equipment and accessories, and its reasonable cost is an invitation to any radio or electronics enthusiast.

Alinco DM-330MV variable voltage power supply, available for \$189.95 from Grove Enterprises and from other MT advertisers.

Performance HF antenna

By Bob Grove W8JHD

With the number of wide-frequency-coverage scanners on the market, it's a relief to see an antenna that is designed to enhance their shortwave performance.

At best, the little rubber duckies that come with these scanners pick up only the strongest shortwave broadcasters, and with propagation as meager as it is during this low in the sunspot cycle, we need all the signal we can get! Enter, the Performance HF antenna.

What you get

Shipped in a well-padded protective box, the Performance includes a black storage pouch which holds the antenna when not in use. The antenna is terminated at its base with an SMA connector to accommodate the smaller pocket scanners, but the also included are a BNC and PL-259 (UHF) adaptor for use with other receivers and scanners. A strain-relief ring is provided as well to bolster the adaptor, as is an Allen wrench for two set screws which secure the base connector.

Fully compressed, the telescoping antenna is only a little more than 12 inches in length, and can be reduced nearly half again for storage by unscrewing the antenna from the band-switching base assembly as shown in the accompanying photo. Protracted to its full extension, however, it is 40 inches long. It's a good thing it's light weight!

Two models

The Performance comes in two versions: SW (41, 31, 19, 16, 13 meters) and ham (80, 40, 20, 15, 10 meters). The switch labeling for these bands is for the convenience of the user who is most likely to select these listening ranges.

However, by com-

bining switches, full 3-30 MHz coverage is possible with either model. A handy, business-card-size, look-up chart is provided for recommended switch combinations.

Let's try it out

For the listening test, we attached the whip alternately to a spectrum analyzer and an AOR short-wave-capable, hand-held scanner. We compared it to both a conventional rubber ducky and to a 48-inch telescoping whip.

The Performance whip outperformed the 48-inch plain whip by 10 to 20 dB between 3

and 30 MHz. Retested both day and night to allow for propagation changes, the gain was the same. Clearly, the pushbutton band selection was a clear advantage.

Needless to say, the difference between the Performance HF and the rubber ducky was vast, often bringing noise-buried signals of the factory antenna up to full quieting with the Performance.

But there are limits

While it is tempting to use the Performance as a substituted VHF/UHF antenna

as well, we found that as we went higher in frequency, the signal became progressively more degraded by the stray reactances of the switching circuitry. Our advice is, keep the Performance for short-wave and switch back to the scanner antenna for typical scanner use above, say, 50 MHz or so.

Also, while it may be tempting to use the Performance antenna on one of the little mobile HF transceivers, don't do it. The small-gauge wiring can't handle transmitter power.

Final comments

While the cost of the Performance antenna is comparable to rooftop discones, keep in mind that this is a patent-pending design with a calibrated set of coils. The price is right for shortwave listeners who need the best reception possible with the shortest unamplified antenna. We see it ideal for travelers, campers, and even tactical applications where reliable HF reception under compact deployment conditions is necessary.

The Performance HF shortwave scanner antenna is available for \$99.95 from dealers such as Grove Enterprises (800-438-8155; www.grove-ent.com) and from Performance HF (858-487-8050; www.performancehf.com).



Amateur Radio Operator's Frequency Guide

By Larry Van Horn, N5FPW

The following frequencies are generally recognized in the United States and selected International Telecommunications Union (ITU) regions for certain modes or activities. All frequencies are in kHz.

160 Meters (1800-2000 kHz)

1800-2000	CW, Phone, Image, RTTY/Data – General, Advanced, Extra licensees
1800-2000	CW
1800-1810	Digital
1806	ALE Channel 1 Region 2/3
1807-1810	PSK31 Region 1
1810	QRP CW calling
1830-1840	CW – Intercontinental DX Window
1840-1850	SSB – Intercontinental DX Window
1840.5	ALE Channel 2 Region 1
1843-2000	SSB, SSTV and other wideband modes
1845	ALE Channel 3 All regions
1910	SSB QRP
1995-2000	Experimental
1996	ALE Channel 4 Region 2
1999-2000	Beacons

80 Meters (3500-4000 kHz)

3500-3510	CW DX Window
3525-3600	CW only – Novice and Technician licensees
3525-3600	CW, RTTY/Data – General, Advanced, Extra licensees
3530	CW – IOTA calling
3559	Feld Hell
3560	QRP CW calling
3570-3575	PSK31
3570-3600	RTTY/Data
3575	Feld Hell
3580-3582	PSK31
3580-3620	RTTY
3582-3589	Feld Hell
3582.5-3584.5	Olivia
3584.5	ALE Channel 5 Region 2/3
3585-3600	Automatically controlled data stations
3590	RTTY/Data DX
3596	ALE Channel 6 Region 2
3600-4000	CW, Phone, Image – Extra licensees
3610	PAX/PAX2
3617	ALE Channel 7 Region 1
3626	ALE Channel 8 All Regions
3700-4000	CW, Phone, Image – Advance licensees
3755	SSB – IOTA calling
3790-3800	SSB DX Window
3791	ALE Channel 9 All Regions
3800-4000	CW, Phone, Image – General licensees
3845	SSTV, ALE Channel 10 Region 2
3885	AM calling
3985	QRP SSB calling
3986-3989	Digital Voice – North America (alternate)
3991-3994	Digital Voice – North America (Primary)
3996	ALE Channel 11 Region 2

60 Meters (5300 kHz)

5330.5	USB only (2.8 kHz wide)/50 watts ERP (Center 5332 kHz)
5346.5	USB only (2.8 kHz wide)/50 watts ERP (Center 5348 kHz)
5366.5	USB only (2.8 kHz wide)/50 watts ERP (Center 5368 kHz)
5371.5	USB only (2.8 kHz wide)/50 watts ERP (Center 5373 kHz)
	ALE Channel 12 All Regions (receive only in the US)
5403.5	USB only (2.8 kHz wide)/50 watts ERP (Center 5405 kHz)
	ALE Channel 13 All Regions (receive only in the US)

40 Meters (7000-7300 kHz)

7000-7010	CW DX Window
7000-7125	CW, RTTY/Data – Extra licensees
7025-7125	CW only – Novice and Technician licensees
7025-7125	CW, RTTY/Data – General and Advance licensees
7030	QRP CW calling/CW – IOTA calling
7030-7040	Feld Hell
7035-7040	PSK31 Region 1, Olivia
7035-7045	RTTY Region 1
7040	RTTY/Data DX
7040.5	ALE Channel 14 Region 1

7055	SSB – IOTA calling (Region 1)
7065	ALE Channel 15 All Regions
7067-7069	Feld Hell
7070-7075	PSK31
7072.5	Olivia Region 2
7075-7082	Feld Hell
7076	Olivia Region 2
7080-7100	RTTY
7080-7125	RTTY/Data
7099.5	ALE Channel 16 All Regions
7100-7105	Automatically controlled data stations
7102	ALE Channel 17 All Regions
7110.5	ALE Channel 18 All Regions
7185.5	ALE Channel 19 All Regions
7125-7300	CW, Phone, Image – Advance and Extra licensees
7171	SSTV
7175-7300	CW, Phone, Image – General licensees
7245	FAX
7285	QRP SSB calling
7286-7289	Digital Voice – North America (Alternate)
7296	ALE Channel 20 Region 2
7290	AM calling
7291-7294	Digital Voice – North America (Primary)

30 Meters (10100-10150 kHz)

10100-10150	CW, RTTY/Data – General, Advanced, Extra licensees (200 watts PEP max)
10106	QRP CW calling
10115	CW – IOTA calling
10130-10140	RTTY/Data
10134.1-10134.7	Olivia
10135-10145	Feld Hell
10136.5	ALE Channel 21 All Regions
10139	JT65, JT65A/B calling
10139-10141	JT65, JT65A/B
10140-10145	PSK31/63
10140-10150	Automatically controlled data stations
10140-10140.1	QRSS, DFCW, WOLF, Jason
10142.5	ALE Channel 22 All Regions
10145.5	ALE Channel 23 All Regions

20 Meters (14000-14350 kHz)

14000-14025	CW DX Window
14000-14150	CW, RTTY/Data – Extra licensees
14025-14150	CW, RTTY/Data – General and Advance licensees
14040	CW – IOTA calling
14060	QRP CW calling
14068	Feld Hell
14070-14072.5	PSK31
14070-14095	RTTY/Data
14071.5-14073.5	PSK63
14075-14082	Feld Hell
14073-14077	CHIP64
14075.5-14078	Olivia
14076	JT65, JT65A/B calling (weak)
14076-14078	JT65, JT65A/B
14078-14080	Throb
14078-14082	MFSK16
14079-14110	RTTY
14095-14099.5	Automatically controlled data stations
14100	IBP/NCDFX beacons
14100.5	ALE Channel 24 All Regions
14100.5-14112	Automatically controlled data stations
14104-14109	Olivia
14109	ALE Channel 25 All Regions
14109-14111	MT63
14112	ALE Channel 26 All Regions, PAX
14150-14350	CW, Phone, Image – Extra licensees
14175-14350	CW, Phone, Image – Advance licensees
14225-14350	CW, Phone, Image – General licensees
14230	SSTV
14233	SSTV Digital DRM
14236-14239	Digital Voice – International
14260	SSB – IOTA calling
14285	QRP SSB calling
14286	AM calling
14342.5	ALE Channel 27 All Regions
14346	ALE Channel 28 All Regions

17 Meters (18068-18168 kHz)

18068-18110 CW, RTTY/Data – General, Advance, Extra licensees
18098 CW – IOTA calling
18100-18105 RTTY/Data, PSK31
18100-18110 RTTY
18101-18107 Feld Hell
18103.1-18103.7 Olivia
18104.5 ALE Channel 29 All Regions
18105-18110 Automatically controlled data stations
18106 ALE Channel 30 Regions 2/3
18110 IBP/NCDXF beacons
18110-18168 CW, Phone, Image – General, Advance, Extra licensees
18117.5 ALE Channel 31 All Regions
18128 SSB – IOTA calling
18157.5 ALE Channel 32 All Regions
18162.5-18165 Digital Voice – International

15 Meters (21000-21450 kHz)

21000-21025 CW DX Window
21000-21200 CW, RTTY/Data – Extra licensees
21025-21200 CW only – Novice and Technician licensees
21025-21200 CW, RTTY/Data – General and Advance licensees
21040 CW – IOTA calling
21060 QRP CW calling
21063-21070 Feld Hell
21070-21075 PSK31
21070-21100 RTTY
21070-21110 RTTY/Data
21086.5-21087 Olivia
21090-21100 Automatically controlled data stations
21096 ALE Channel 33 Regions 2/3
21116 ALE Channel 34 Region 1
21150 IBP/NCDXF beacon
21152.5-21153.5 Olivia
21200-21450 CW, Phone, Image – Extra licensees
21225-21450 CW, Phone, Image – Advance licensees
21260 SSB – IOTA calling
21275-21450 CW, Phone, Image – General licensees
21340 SSTV
21345 FAX
21385 QRP SSB calling
21437.5 ALE Channel 35 All Regions

12 Meters (24890-24990 kHz)

24890-24930 CW, RTTY/Data – General, Advance, Extra licensees
24920 CW – IOTA calling
24920-24925 RTTY/Data, PSK31, Feld Hell
24920-24930 RTTY

24925-24930

Automatically controlled data stations
ALE Channel 36 All Regions
24926
24930 IBP/NCDXF beacons
24930-24990 CW, Phone, Image – General, Advance, Extra licensees
24932 ALE Channel 37 All Regions
24950 SSB – IOTA calling

10 Meters (28000-29700 kHz)

28000-28025 CW DX Window
28000-28300 CW, RTTY/Data – Novice and Technician licensees (200 watts PEP max)
28000-28300 CW, RTTY/Data – General, Advance, Extra licensees
28040 CW – IOTA calling
28060 QRP CW calling
28063-28070 Feld Hell
28070-28120 RTTY/Data
28070-28150 RTTY
28076 Olivia
28100-28110 Feld Hell
28120-28125 PSK31
28120-28189 Automatically controlled data stations
28146 ALE Channel 38 Regions 2/3
28190-28225 Beacons
28200 IBP/NCDXF beacons
28300-28500 CW, Phone – Novice and Technician licensees (200 watts PEP max)
28300-29700 CW, Phone, Image – General, Advance, Extra licensees
28312.5 ALE Channel 39 Region 1
28327.5 ALE Channel 40 All Regions
28385 QRP SSB calling
28460 SSB – IOTA calling
28560 SSB – IOTA calling
28680 SSTV
29000-29200 AM
29300-29510 Satellite downlinks
29520-29580 FM repeater inputs
29600 FM simplex
29620-29680 FM repeater outputs

Note 1: This list is not intended as any kind of recommendation for the band usage other than what is called for under FCC regulations. Some band plans may conflict with FCC regulations regarding the use of certain modes in other regions. These entries are not any sort of legal reference. You should check with current regulations for your allowed frequencies, modes and bandwidths based on your class of license.

Note 2: You can get complete details on the amateur radio ALE band plans at <http://hflink.com/channels/>



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An EASY Power Supply !

By Carl Herbert AA2JZ

Need an additional power supply for your 2 Meter rig?

I was in that position just a short while ago, when I acquired a used Icom IC-2100H. My usual power supplies were attached to HF gear, and I didn't want to disconnect them. I also wanted the 2 Meter rig to be available in "scan mode," so a permanent power source was needed.

Short on cash and long on thrifty, I remembered some old desk top computers stored away in the rear of the garage. They were functional (working, but way beyond today's requirements) when they were removed from use. Each had a 330 watt switching power supply inside. I'm not a computer "guru," but I wondered if one of those power supplies would work.

❖ Mixed Bag

Gee whiz, it's amazing that they could function at all with the amount of dirt accumulated in them! After an easy removal of removing a few screws and unplugging the connectors, some cleaning with compressed air was needed! The label on the case gave the following information;

DELL™
MODEL: NPS-330CB B
INPUT: 100-120V ~ /6.0A50-60Hz
200-240V ~ /3.0A
OUTPUT: +12V @ 18.0A

And more information about lower and negative voltages was available, but those weren't of interest to me. I was concerned about the positive 12 volts at the supposed 18 amperes that could be available.

The Icom specification sheet says that the unit requires "less than 12 Amperes @ 13.8 Volts D.C." That sounded almost too good to be true! The rig was rated at drawing less current than the power supply was designed to deliver. Now all that remained was to do some minor "surgery" on the power supply, like attaching

an "on/off" switch, and some longer power leads, and the unit would be up and running. Or so I thought!

❖ Deductive Reasoning

A power cord was attached to the power supply and the unit plugged into the house supply. And guess what! Nothing happened. The fan didn't come on, an indication of A.C. being provided to the power supply.

Now, I know for a fact that those computers worked when they were put away. There must be something I'm not aware of when it comes to computer power supplies. So it was off to the Internet to see if I could find some guidance from that source.

Sure enough, the data¹ I gleaned from the "web" indicated that the supplies only function when a "signal" from the "mother board" is present on connector P-1. P-1 is the largest of the various connectors, having 22 connections available. The others, P-2,3,4,etc. are smaller in size, and are for powering the peripheral equipment in the computer. P-1 is the main power connector that is attached to the "mother board."

O.K., that makes sense, but what "signal" could be there when the computer isn't running? The "signal," as it's called, is a high resistance connection to ground (common) about 4 Megohms, and indicates to the system that P-1 is properly installed in the appropriate socket. They call it "PWR-OK." A check of the "motherboard" showed that two "pins" on the P-1 socket were labeled "POWER."

Using this information, I attached a jumper between the two associated "pins" indicated, plugged in a power cord, and again attached it to the house voltage. Success ! The fan began operation and I could begin identifying the voltages present on the various "pins."

This is a good place to mention safety. Using a "jumper connection" to activate the power supply for investigation can be DANGEROUS. Plugging equipment with exposed "leads" could lead to

some "hair raising" experiences. They're not really "exposed," as they're encased in their plastic connectors. But, use caution and be careful!

I was "lucky" in that my "mother board" was marked with the "PWR-OK" location which corresponded with the "Gray and Black" leads on P-1. These colors followed the "color scheme"; others may not be so informative. From the data gleaned from the "web," it also seems that not all manufacturers follow the "color codes" for the leads from their required power supplies.

My power supply followed the "color code scheme" for the "PWR-OK" connection, but didn't follow most of the remainder. Using a multimeter, I checked for voltages present on each of the "pins." There were two pins (yellow leads) having the positive 12 V D.C. I wanted to use.

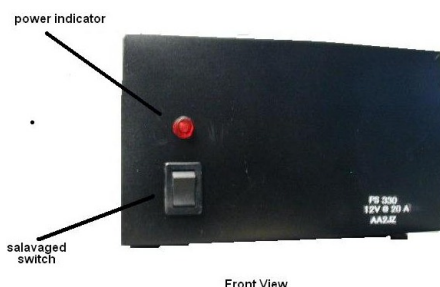
But first I fashioned a metal "L" bracket to fasten an "ON/OFF" switch to the outside of the power supply. I used self tapping screws to attach it, and made a visual inspection of the inside of the power supply to ensure that they wouldn't be too long and cause a problem when drilled into the case. With the new power switch installed, it made checking for voltages much easier and safer.

❖ Wrap-Up and Testing

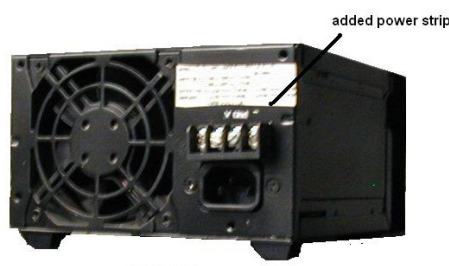
One of the leads providing +12V D.C. (Yellow) and one "common" lead (Black) were "snipped" from P-1 and extended. These were attached to the IC-2100H, and power was applied. The transceiver received enough voltage and current to function in the receive mode. Now to see if the power supply would provide the current needed in the transmit mode.

I attached a power meter between my dummy load and the transceiver and keyed the mic. The unit was putting out full power without a problem. I removed the dummy load and switched to my local repeater frequency. A short chat with one of the local "hams" provided the "test by fire" of the system. The report received was all good, no hum, full quieting, etc. I then lowered the output power to "Mid Range" (10 watts). I didn't need High Power to activate the repeater, and I didn't want to put additional strain on the power supply when not required.

To eliminate the ugly "test" setup, I disassembled the unit and gave it a thorough cleaning. While I was doing this, the excess voltage leads were desoldered from the main board. In this power supply, all leads of a given color were



Front View



Rear View

crimped together and soldered into a common hole(s). They aren't difficult to remove using a suitable "higher wattage" iron or soldering gun. Remember not to remove the four leads that you need, or you'll be soldering them back in.

Having a clean front panel without binding lugs appeals to me. I attached a suitable binding strip to the rear of the unit just above the A.C. power socket. It was the only place having adequate clearance for the voltage leads. The front panel sports a power switch salvaged from "Mr. Coffee™" and a 12 V D.C. indicator² from "Radio Shack.™" Some paint was applied, rubber feet to protect my desk, some screws to hold it all together, and the rehab of the unit was complete. The computer power supply is internally fused, so there wasn't a need to install another.

For the past three months the power supply has been functioning daily. I think it looks acceptable, and I really like the cost savings it has provided. It was a pleasant project, not much in the technical department, mostly sheet metal adaptation and excess wire removal.

Parts:

¹ <http://www.xoxide.com/buy-computer-power-supplies.html>

² RS 272-331 Red Lamp Assembly, 12 v

The usual assortment of hardware, nuts, screws, etc. It depends upon your needs.

My power switch is a "salvaged" item, any switch for service in the 110-120 vac range will suffice.

Outer Limits continued from page 59

WJPL- Some pirate dusted off recordings of this classic New York City pirate. Their shows were hilarious, but the identity of their modern relay is unknown. (None)

Wolverine Radio- Comedy and classic rock music are their fare. Your editor thinks that the IDs sound like "Long Range Radio," but they really are for Wolverine radio. (None announced)

WMPR- The Dance Party format from "Micro Power Radio" keeps techno rock programming on short-wave. (None; has verified only at the Kulpville Winter SWL Festival)

WTCR- It is no surprise that "Twentieth Century Radio," plays music from the 1900s. Music styles and decades vary. (Belfast)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 146, Stoneham, MA 02180; and PO Box 293, Merlin, Ontario N0P 1W0.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletin for submitting pirate loggings with a hope that pirates might QSL is now the e-mailed *Free Radio Weekly* newsletter, still free to contributors via freeradioweekly@gmail.com. A few pirates will sometimes QSL reports left on the outstanding Free Radio Network web site, at www.frn.net

on the internet. *The ACE*, a formerly widely read print bulletin, now has a good loggings section and a valuable archive of *Free Radio Weekly* issues on its [www.theaceonline.com/ web site](http://www.theaceonline.com/web site).

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Guy Atkins, Payallup, WA; Kirk Baxter, North Canton, OH; Artie Bigley, Columbus, OH; Wendel Craighead, Prairie Village, KS; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Bill Finn, Philadelphia, PA; John M. Fisher, North Chelmsford, MA; Harold Frodge, Midland, MI; Captain Ganja, Belfast, NY; William T. Hassig, Mt. Prospect, IL; Harry Helms, Corpus Christi, TX; Dan Henderson, Laurel, MD; John Herkimer, Caledonia, NY; Ed Insinger, Summit, NJ; Don Jensen, Kenosha, WI; Ed Kusalik, Camrose, Alberta; Chris Lobdell, Tewksbury, MA; Greg Majewski, Oakdale, CT; A. J. Michaels, Blue Ridge Summit, PA; Joe Miller, Troy, MI; Don Moore, Davenport, IA; John Morris, Whidbey Island., WA; Adrian Peterson, Indianapolis, IN; John Poet, Belfast, NY; Martin Schoech, Eisenach, Germany; Gayle Van Horn, Brasstown, NC; Bob Wilkner, Pompano Beach, FL; Joe Wood, Greenback, TN; Dave Zantow, Janesville, WI; Bob Zanotti, Langnau, Switzerland.

Alinco DM-330MVT



This handsome, compact, voltage-variable power supply can produce over 30 amps of current—more than 500 watts—to your choice of equipment or accessories! Select 5 to 15 VDC as displayed on the back-lighted meter, and read the current drain as well! Concerned about switching noise? This supply has an adjustment to tune out any of those annoying harmonics!

The programmable pre-set voltage function makes the DM-330MV even easier to use. Just store the most frequently used voltage in the memory, and it is constantly ready to go. A cigar-plug socket (Max 10A), a set of Max current terminals, and 2 sets of snap-in terminals (Max 5A) are conveniently laid-out and offer numerous variations for its operation.

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72 MONITORING TIMES October 2008

“BackUp and Restore” is a very useful application that is always running in the background of your computer. It constantly monitors and “remembers” the slightest changes that are made to your PC.

At a scheduled time, or on user demand, an exact image file of your computer is created. This file should then be stored on a CD. Now if a catastrophe should occur – say a destructive virus attack – using your image file on CD and ATIH, you can bring your computer to exactly the operational condition it was at the time the image file was created. This is not a new function; in fact, operating systems have this capability built into them. Although I have not tried ATIH in this mode myself, from the blogs and reviews I read ATIH is much faster and easier to use.

❖ Try & Decide

Do you ever make changes to your system in order to see if you can get more speed or performance? After reading articles on the subject of system performance optimization, I do. I’m constantly stopping autostart programs, adjusting Internet connection parameters and more. The Try & Decide feature allows you to temporarily make these changes and then see their effect.

If you don’t like what you see, everything you did can be reversed with one keystroke. If you like what you see, the changes can be made permanent with a keystroke. I found it quite useful and a nice bonus addition to my primary reason for having ATIH. This feature reminds me of a program that we looked at in this column about a year ago called SandBoxie.

❖ Getting to the Point

The Disk Utilities category is the reason we are here. This allows us to “... clone existing hard drives, add new disks or clean up your system.” Selecting this category displays the screen in Figure 4.

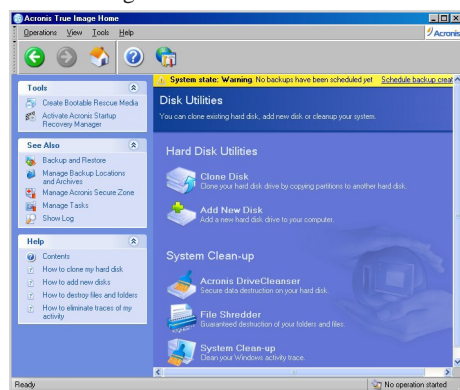


Figure 4 – What we were trained for - ATIH Disk Utilities Menu

Clearly, for our purpose today the first operation is what we need. But before we leave this screen, notice the other useful operations that we have at our disposal in ATIH. Also take a look at the menu items on the left of the screen. If you get in trouble or are performing this cloning for the first time, click on the “How to clone my hard drive” under the Help topic.

This will display detailed step-by-step instructions. We were right to assume the ATIH was user friendly.

I got to this point and then asked myself the question, “How was I going to attach my new 160 GB, 2.5 inch, hard drive to my laptop, while I still had my old 80 GB in place?” For desktop PCs this is not problem. Everyone has at least two hard drive connections. But laptops, to conserve space, have only one hard drive connection. Now what?

❖ An Adapter for All Seasons

Digging in my extensive cables and adapter cabinet I found the answer: the USB to hard drive adapter. This attaches via any USB port to a desktop or laptop and provides connection for an IDE or SATA, 3.5 or 2.5 inch, hard drive. Just what we need!

These adapters are available on the Internet from various companies at a range of prices. The one I use constantly for testing hard drives of all kinds, was from www.Cyberguys.com part number 131 0852. It costs about \$40 plus shipping, but is very well constructed, an important consideration if you intend to use it often. It is quite handy if you have a few hard drives lying around the shack. You can find it at www.cyberguys.com/templates/SearchDetail.asp?productID=12944&ta=prod_info. This model contains an eSATA port for blazing data transfers to SATA drives. It also has simultaneous dual drive capability.

If you really are only going to use the adapter for a bi-annual drive upgrade, a cheaper solution can also be found at Cyberguys. This is part number 131 0863 currently selling at about \$25 plus shipping. It will do the job just fine for infrequent cloning. However, it does not have the eSATA, dual drive capability and is less robust in construction. It can be found at www.cyberguys.com/templates/SearchDetail.asp?productID=13779. When you go to Cyberguys tell them you saw it in *MT's Computers & Radio* column.

Connecting my new hard drive to the adapter and then plugging it into the laptop's USB port, I wondered if ATIH would recognize this arrangement. Selecting Clone Disk I thought, “We’ll soon see.”

❖ I “C:” You!

Yes! The USB connected drive was recognized by ATIH. Next, I was given a choice of Automatic or Manual mode. That was a no brainer. Or maybe that’s the reason I picked Automatic. If your new drive is un-partitioned, ATIH will automatically make it the new cloned drive. But if your new clone drive is partitioned, you will have to select from a menu which is the original drive and which the new clone drive. Make your selection VERY carefully.

Then you must allow ATIH to delete the partition on the NEW CLONE Drive. Be careful not to make a mistake here! Re-check that you have chosen the correct clone drive. The good news is that we are pretty much done.

Finally, we need to answer a few obvious questions, such as “What do you want to do to the old disk? Keep data, Destroy data, Create new partition.” However, a question that I was not sure how to answer was “Select Partition Transfer Method.” Three choices are given: As is, Proportional, and Manual. Although ATIH Help file gives details of each, I still was not sure of the best one for me. With a deep breath I choose Proportional and the cloning process begin.

❖ Wait and C:

“Just sit back, have patience and relax while the long process takes place,” I anxiously told myself. For my system the total time was over an hour. During this time ATIH will provide a graphical display of the two drives and its progress. When cloning is completed, a summary screen is displayed.

Thankfully, the ATIH “Error while performing the operation” message did not appear. But had that happened, ATIH would have detailed the problems it encountered and suggested methods of correcting. For me, with the successful clone summary screen displayed, that was all behind me, or at least *appeared* to be behind me. I wouldn’t know if the process was successful until I removed the old drive and physically replaced with the new clone and then gave it a try.

❖ Did ATIH Do The Job?

I’m happy (and relieved) to report that things could not have gone better or easier. Initial boot-up felt a bit longer than usual. Or was it just my anxiety? From there everything worked great. Thank you, Acronis True Image Home!

Six programs required me to re-enter their CD keys, which they accepted without a problem. Four of these programs were from Microsoft, including the Vista operating system.

My laptop with the new 160 GB drive has been in constant use for over a month without a problem.

❖ Legal Caution

When you purchased many of your programs, especially Microsoft programs, you agreed to a “one computer use” clause. This restricts you, under penalty of law, from installing and running the program on more than one system. In plain English “No Pirating!” Therefore, once you are absolutely sure that your new drive is working perfectly; you should erase these “one computer use” programs and operating system from your old hard drive. You have been warned.

You can purchase your copy of Acronis True Image Home version 11 at www.acronis.com/homecomputing/products/trueimage/features-storage-media.html. The program does much more than we covered. Tell them you saw it in *MT's Computers & Radio* column. Now, what am I going to do with my new hard drive storage? I’ll never use it all.

What's NEW

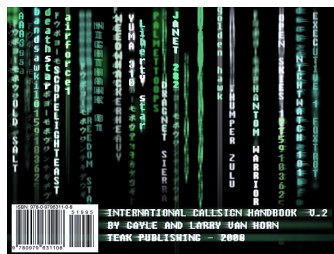
Tell them you saw it in Monitoring Times

International Call-sign Handbook

2nd Edition

By Gayle and Larry Van Horn

After more than a decade without it, radio monitors once again have a single, exhaustive publication to help them identify radio signals on the various radio bands. The new *International Callsign Handbook* on CD-ROM from Teak Publications has been expanded from the first edition printed by Grove Enterprises to cover even more types of callsigns and radio transmission IDs used throughout the HF, VHF and UHF radio bands. This giant, more than 1,100 page callsign reference uses the Adobe Acrobat platform. All text is fully searchable and can be printed by the user.



The ten chapters in this book cover various identification types, including internationally assigned callsigns (including ships), airline calls, ship and coastal maritime mobile service identification (MMSI) numbers, ALE addresses, selected aircraft selcalls, selected ICAO24 aircraft codes, and introductory material. The single largest chapter of this book has an extensive listing of tactical call words and IDs used by civilian, military, and government agencies.

This is a self-loading (Windows XP/Vista platforms only), easy-to-use CD-ROM ebook and it is available from Grove Enterprises (1-800-438-8155) or Teak Publishing (P.O. 295, Brasstown, NC 28902). The cost is \$19.95 plus shipping (NC residents must add state sales tax).

Keep an eye out on the Short-wave Central (<http://mt-short-wave.blogspot.com/>) or the Milcom Monitoring Post (<http://mt-milcom.blogspot.com/>) blogs for availability and additional dealers worldwide, and watch this column for a full, independent review.

Coming Soon: New Uniden Scanners

We have recently learned that Uniden will be releasing two new handheld scanners later this year. Two new Uniden support Yahoo-groups (below) were recently discovered by this columnist while roaming around the net.

<http://groups.yahoo.com/group/BCD396XT>

<http://groups.yahoo.com/group/BC346XT>

The BC346XT will probably be a follow-on product to the original Uniden BC-246 handheld, the first to have dynamic memory. Both units will probably have updated features, with the 346 maintaining its analog pedigree and the BCD396XT continuing its digital lineage.

ARRL Repeater Directory

The ARRL has recently released the 2008/2009 edition of their annual repeater directory in three different formats.

The printed, pocket-sized edition, perfect for mobile operations, is now one-half-inch bigger: 3.75 x 5.25 inches. The desktop-sized edition measures 6 x 9 inches. Both editions have over 20,000 listings for VHF/UHF repeaters across the US and Canada.

Both print editions have some new and improved features that include:

Handy indexing tabs on the cover to aid in quickly finding the listings you're looking for.

Easier-to-read listings.

Repeater notes located right up front.

Icons to make it easy to distinguish "open" systems from limited access repeater systems.

Along with these new features, the *ARRL Repeater Directory* includes:

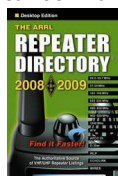
Repeater operating practices, repeater lingo and hints for newly licensed hams.

Frequency Coordinator contact information.

D-Star and APCO 25 repeaters

Using CTCSS tones and Digital Coded Squelch (DCS)

VHF/UHF Band Plans



and 2-meter channel-spacing map
Tips for handling interference
IRLP, WIRES-II, and EchoLink® (Internet linked) nodes
Emergency Message Handling procedures
Transceiver Memory Log

The third format for this annual publication is available on CD-ROM. The *TravelPlus* CD-ROM with *BONUS Repeater Directory*, Version 12.0, is a power packed CD for hams who use electronic publications.

With *TravelPlus for Repeaters™*, you have the power of *The ARRL Repeater Directory®* on your computer. With *TravelPlus for Repeaters™* as your traveling companion, you'll never be alone on the road. Locate ham radio repeaters along US and Canadian travel routes using this map-based software.

This feature-packed CD-ROM includes the following features:

Map your travel route and tune in. Supports GPS (with separate external hardware*).

View and print maps and repeater lists.

Access the ARRL Repeater DataBase, global Internet linked nodes, AM/FM radio, broadcast television, and NOAA weather stations, USA and Canadian licenses, and ham radio points of interest.

Export data. Transfer to Palm™ or Pocket PC, radio programming software, and more.

*Cable and adapter purchased separately (not supplied with *TravelPlus*) and Palm is a trademark of Palm, Inc.

This CD requires Microsoft Windows XP or Vista and a Pentium or comparable processor.

The pocket-sized book (ISBN: 0-87259-127-1) ARRL #1271 costs \$10.95 and the Desktop edition (ISBN: 0-87259-129-8) ARRL #1298 sells for \$15.95, both plus shipping. The *TravelPlus for Repeaters* CD-ROM. (ISBN: 0-87259-130-1) ARRL #1301 retails for \$39.95 plus shipping.

These fine amateur publications are available from the ARRL website (www.arrl.org), via their toll free order line at 1-888-277-5289 9 (8 a.m. to 5 p.m. Monday through Friday, except holidays), or snail mail to ARRL, 225 Main Street, Newington, CT 06111-1494. Also check your local amateur radio dealer for these and other ARRL publications.

DX Bulletin Reader 1.0

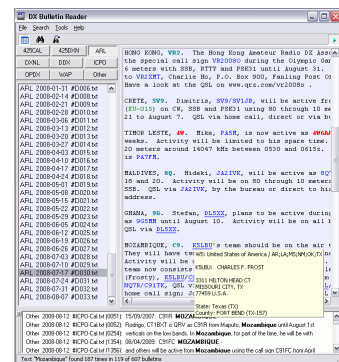
If you are an amateur radio operator and chase DX, we have found a nice piece of software that will aid you in your pursuit of that elusive new country or grid you are seeking. Alex Shovkoplyas, VE3NEA, and his company Aftree Software, Inc, have released the DX Bulletin Reader 1.0 for Windows 95/98/ME/NT4/2000/XP.

DX Bulletin Reader is a tool for viewing, archiving and searching the DX news bulletins.

When the program displays a DX bulletin, it highlights all prefixes, callsigns, IOTA references and grid squares in different colors, and, best of all, it highlights the items that are on your DXCC and IOTA Needed lists.

Every highlighted item has a tooltip with extra information, such as IOTA group name and prefix, country of the callsign, and latitude/longitude of the Grid Square.

If the optional databases are installed, even more information is shown on the tooltips, including the full name and address for the US and Canadian callsigns.



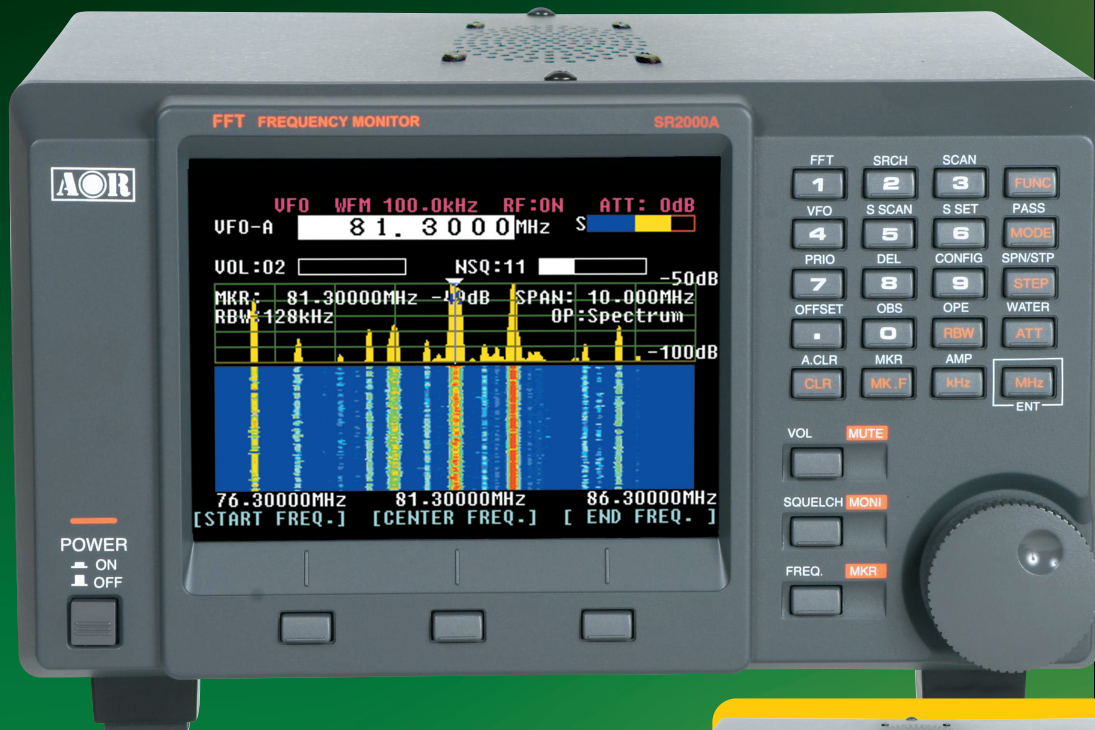
The program includes a find function that performs full text search in all archived bulletins. The best part of this program is the cost – Free!

You can download the DX Bulletin Reader 1.0 software package on Alex's website at www.dxatlas.com/BullRead/. While you are there, be sure to check out some of the other software offerings that Alex has written, including his popular DXAtlas and IonoProbe propagation software packages. And be sure to tell Alex that *MT's What's New* sent you.

Books and equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Larry Van Horn, larryvanhorn@monitoringtimes.com

Watch What Happens!

The SR2000A is an ultra-fast spectrum display monitor that lets you SEE received signals in FULL COLOR



AOR SR2000A Frequency Monitor

- Frequency coverage: 25MHz ~ 3GHz (no gaps)*
- Ultra-stable, high-sensitivity triple-conversion receiver
- External video output (composite video)
- AM/NFM/WFM/SFM/TV receive modes
- Displays up to 40MHz of spectrum bandwidth (20MHz or 40MHz selectable)**
- P25 decoding function available with optional P25-8600
- Waterfall (time) display function
- 1000 memory settings (100ch x 10 memory banks)
- Average or peak value readings

Using the power of FFT (Fast Fourier Transform) algorithms with a powerful receiver covering 25MHz ~ 3GHz, the SR2000A features a color monitor that displays up to 40MHz spectrum*



- Video display function (NTSC/PAL/SECAM auto select)***
- 5 inch TFT color LCD display
- Versatile color display uses state of the art digital signal processing

*bandwidth or video display of NTSC, PAL or SECAM signals.
Ultra-sensitive, incredibly fast, yet easy to use, with a high quality
internal speaker for crisp, clean audio signals.*

*Scans 10MHz in as little as 0.2 seconds! Instantly
detects, captures and displays transmitted signals.*

- High speed FFT search quickly captures new signal transmissions
- Easy menu-driven operation
- PC control through RS232C serial port or USB interface



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AOR U.S.A., Inc.
20655 S. Western Ave., Suite 112, Torrance, CA 90501, USA
Tel: 310-787-8615 Fax: 310-787-8619
info@aorusa.com <http://www.aorusa.com>

*Government version. Cellular blocked for US consumer version.

**No audio is available when the frequency span is set to 20MHz or 40MHz.

***No audio available while displaying video signal on the LCD. If both video and audio need to be monitored simultaneously, an optional (external) TV2000 is required.

**AOR**

AR-5000A Plus 3	RCV44P	\$2569.95
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AOR SR2000A (B)	RCV36	\$2899.95

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KA1103	RCV55	\$89.95
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R1500	RCV25	\$599.95
PCR2500	RCV35	\$729.95
R2500	RCV52	\$899.95

WiNRADiO

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WR-G33EM/GPS	RCV16/GPS	\$999.95
WR-G33WSM	RCV28	\$999.95
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WR-3500 (Internal)	RCV49-I	\$2195.95
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<http://americanbandscan.blogspot.com/> - by Doug Smith

MT: EDITOR'S DESK
(Corrections posted here as well as on MT website)
<http://mt-editor.blogspot.com/> - by Rachel Baughn

MT: FED FILES
<http://mt-fedfiles.blogspot.com/> - by Chris Parris

MT: MILCOM
<http://mt-milcom.blogspot.com/> - by Larry Van Horn

Larry's Monitoring Post
<http://monitor-post.blogspot.com/> - by Larry Van Horn

MT: SHORTWAVE
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*Frequency specs may vary. Refer to owner's manual for exact frequency specs.
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